Air Quality Updating and Screening Assessment for St Albans City and District Council

A report produced for St Albans City and District Council

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Executive Summary

The UK Government published its strategic policy framework for air quality management in 1995 establishing national strategies and policies on air quality which culminated in the Environment Act, 1995. The Air Quality Strategy[1] provides a framework for air quality control through air quality management and air quality standards. These and other air quality standards[1] and their objectives have been enacted through the Air Quality Regulations in 1997, 2000 and 2002[2]. The Environment Act 1995 requires Local Authorities to undertake air quality reviews. In areas where an air quality objective is not anticipated to be met, Local Authorities are required to establish Air Quality Management Areas and implement action plans to improve air quality.

The first and second rounds of air quality review and assessments has now been completed for St Albans City and District Council**.** The Local Authority is required to proceed to the third round of review and assessment. This round of review and assessment is to be undertaken in two steps. The first step is an Updating and Screening Assessment, which updates the Stage 1 and 2 review and assessment previously undertaken for all pollutants identified in the Air Quality Regulations. Where a significant risk of exceedance is identified for a pollutant it will be necessary for the local authority to proceed to a Detailed Assessment, equivalent to the previous Stage 3 assessments. Where a local authority does not need to undertake a Detailed Assessment, a progress report is required instead.

The Updating and Screening Assessment should consider any new monitoring data, new sources or significant changes to existing sources (either locally or within neighbouring authorities), or any other local changes that may be significant. It should also carefully consider any relevant changes to public exposure e.g. new residential developments alongside busy roads etc, if these locations were not fully evaluated in previous Review and Assessment reports. It is not necessary to re-assess the issues that have already been adequately considered in previous rounds.

This report is equivalent to an Updating and Screening Assessment for St Albans City and District as outlined in the Government's published guidance.

The general approach taken to this Updating and Screening Assessment was to:

- Identify the conclusions of the last round of review and assessment for each of the seven pollutants included in the air quality regulations;
- Identify significant sources of emissions to air for the seven pollutants included in the air quality regulations, including major roads and industrial plant;
- Identify new sources not previously considered in the first two rounds of review and assessment;
- Identify any sources for which emissions have changed significantly since the last round of review and assessment;
- Identify and interpret the significance of air quality monitoring data made available since the last round of review and assessment;
- Assess the risk of exceedances of the air quality objectives in locations where relative public exposure may exist using screening models and nomograms; and
- Where necessary, identify locations and pollutants for which further detailed assessment of air quality will be required.

[1] Refers to standards recommended by the Expert Panel on Air Quality Standards. Recommended standards are set purely with regard to scientific and medical evidence on the effects of the particular pollutants on health, at levels at which risks to public health, including vulnerable groups, are very small or regarded as negligible.

What are the conclusions of this report for St Albans City and District Council?

Carbon monoxide
There are no roads in St Albans City and District which can be classified as 'very busy' according to the criteria in the guidance. There are no industrial processes which are significant sources of carbon monoxide. Exceedances of the air quality objective for carbon monoxide are therefore unlikely.

A detailed assessment is not required for carbon monoxide in St Albans City and District.

Benzene
There are no roads in St Albans City and District, which can be classified as 'very busy' according to the criteria in the guidance. There are no petrol stations with a throughput greater than 2 million litres and with relevant exposure within 10m of the pumps.

A detailed assessment is not required for benzene in St Albans City and District.

1,3-Butadiene
Estimated background concentrations and data from national monitoring stations indicate that the objective for 1,3-butadiene is likely to be achieved by the end of 2003. There are no industrial processes, current or proposed, in St Albans City and District, which have the potential to emit 1,3-butadiene.

A detailed assessment is not required for 1,3-butadiene in St Albans City and District.

Lead
Emissions of lead from industrial processes in St Albans City and District are likely to be very small and it is unlikely they will cause exceedances of the air quality objectives for lead in 2004 and 2008.

A detailed assessment is not required for lead in St Albans City and District.

Nitrogen dioxide
No roads or busy junctions were identified using DMRB where the objectives were likely to be exceeded.

NO_2 concentrations in 2005 measured using diffusion tubes were above the annual mean limit objective of 40 μgm^{-3} at six sites:

SA 07 Waterdale Bricket Wood (M1)
SA 15 Peahen PH Holywell Hill St Albans
SA 22 Lybury Lane Redbourn (M1)
SA 30 Smug Oak Lane Bricket Wood (M25)
SA 31 Radlett Road (M25)
SA 33 Mount Drive Park Street

The conclusions for these areas are as follows:

- Diffusion tubes SA 15, SA 30 and SA 31 are within existing AQMAs.

- The area of Lybury Lane Redbourn (SA 22) was considered in the 2004 Detailed Assessment and it was concluded that there were no relevant receptors in the areas of exceedence and that no further action was necessary.

- The Bricket Wood Area (SA 07) is within a revoked AQMA. The area was remodelled for the Stage 4 Assessment. This assessment concluded that no exceedances were likely at relevant locations in Bricket Wood.

- Mount Drive/Park Street (SA 33); This is a kerbside site and the nearest receptor is 36m away. Using the factor of 0.75 to as given in the Air Quality Review and Assessment website the concentration at the nearest building facade is estimated to be 31.5 μgm^{-3}.

A detailed assessment is not required for nitrogen dioxide in St Albans City and District.

Sulphur dioxide
There are no significant industrial or domestic sources of sulphur dioxide in St Albans City and District.

A detailed assessment is not required for sulphur dioxide.

PM_{10}
The DMRB screening tool indicates that the annual mean concentration and the daily mean objectives for 2004 will have been achieved. The projected 2010 annual mean concentration and daily mean objectives are likely to be widely exceeded in that year.

A detailed assessment is not required for PM_{10}.

Recommendations
This updating and screening assessment for St Albans City and District Council has concluded that all the objectives in the Air Quality Regulations for England will be met by the relevant dates at most locations in St Albans City and District.

The EU annual average limit value (Stage 2) for PM_{10} may be exceeded at some locations within the District, close to busy roads and junctions in 2010.

Maps reproduced within this document

Acronyms and definitions used in this report

AADTF	Annual Average Daily Traffic Flow
AQMA	Air Quality Management Area
AURN	Automatic Urban Network (defra funded network)
CO	Carbon monoxide
DETR	Department of the Environment Transport and the Regions (now defra)
defra	Department of the Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges
EPAQS	Expert Panel on Air Quality Standards (UK panel)
EU	European Union
GIS	Geographical Information System
HA	Highways Agency
kerbside	0 to 1 m from the kerb
Limit Value	An EU definition for an air quality standard of a pollutant listed in the air quality directives
MW_{th}	Mega Watts (thermal)
NAEI	National Atmospheric Emissions Inventory produced by netcen on behalf of defra
NO_2	Nitrogen dioxide
NO_x	Oxides of nitrogen
NRTF	National Road Traffic Forecast
ppb	parts per billion
receptor	In the context of this study, the relevant location where air quality is assessed or predicted (for example, houses, hospitals and schools)
roadside	1 to 5 m from the kerb
SO_2	Sulphur dioxide
USA	Updating screening assessment
TEMPRO	A piece of software produced by the defra used to forecast traffic flow increases

Contents

1 Introduction to the Updating and Screening Assessment

This section outlines the purpose of this Updating and Screening Assessment and the scope of the assessment.

1.1 PURPOSE OF THE UPDATING AND SCREENING ASSESSMENT

The first and second rounds of air quality reviews and assessments are now complete and all local authorities should have completed all necessary stages. Where the likelihood of exceedances of air quality objectives have been identified in areas of significant public exposure, an air quality management area should have been declared, followed by a further (formerly Stage 4) review and assessment, and the formulation of an action plan to eliminate exceedances. Local authorities are now required to proceed to the third round of review and assessment in which sources of emissions to air are reassessed to identify whether the situation has changed since the first round of review and assessment, and if so, what impact this may have on predicted exceedances of the air quality objectives. Such changes might include significant traffic growth on a major road, which had not been foreseen, construction of a new industrial plant with emissions to air, or significant changes in the emissions of an existing plant.

The third round of review and assessment is to be undertaken in two steps. The first step is an Updating and Screening Assessment, which updates the Stage 1 and 2 Updating and Screening assessments previously undertaken for all pollutants identified in the Air Quality Regulations. Where a significant risk of exceedance is identified for a pollutant it will be necessary for the local authority to proceed to a Detailed Assessment, equivalent to the previous Stage 3 assessments. Where a local authority does not need to undertake a Detailed Assessment, a progress report is required instead.

1.2 OVERVIEW OF APPROACH TAKEN

The general approach taken to this Updating and Screening Assessment was to:

- Identify the conclusions of the last round of review and assessment for each of the seven pollutants included in the air quality regulations;
- Identify significant sources of emissions to air for the seven pollutants included in the air quality regulations, including major roads and industrial plant;
- Identify new sources not previously considered in the first round of review and assessment;
- Identify any sources for which emissions have changed significantly since the last round of review and assessment;
- Identify and interpret the significance of air quality monitoring data made available since the last round of review and assessment;
- Assess the risk of exceedances of the air quality objectives in locations where relative public exposure may exist using screening models and nomograms; and
- Where necessary, identify locations and pollutants for which further detailed assessment of air quality will be required.

1.3 RELEVANT DEFRA DOCUMENTATION USED

This report takes into account the guidance in LAQM.TG(03)[1] published February 2003 and the LAQM TG(03) update published January 2006.

1.4 POLLUTANTS CONSIDERED IN THIS REPORT

All pollutants included in the Air Quality Regulations[2] for the purposes of Review and Assessment have been considered in this report.

1.5 STRUCTURE OF THE REPORT

The report is structured as follows:

Section 1 summarises the conclusions of air quality review and assessment work to date, the aims of the updating and screening assessment, the approach adopted for the assessment, as well as relevant background information on the St Albans City and District and relevant emissions-to-air sources;

Section 2 identifies data used in support of this assessment and highlights significant changes in emissions to air within the District since the first round of review and assessment;

Sections 3-9 present the review and assessment for each of the seven pollutants included in the Air Quality Regulations;

Section 10 presents conclusions and recommendations for further work, where required, for each of the seven pollutants;

The Objectives of the Air Quality strategy are shown below in Table 1.1. Further details of the Air Quality Strategy are given in Section 13.

Table 1.1 Objectives included in the Air Quality Regulations 2000 and (Amendment) Regulations 2002 for the purpose of Local Air Quality Management

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene All authorities	16.25 μg/m^3	running annual mean	31.12.2003
Authorities in England and Wales only	5.00 μg/m^3	annual mean	31.12.2010
Authorities in Scotland and Northern Ireland only[a]	3.25 μg/m^3	running annual mean	31.12.2010
1,3-Butadiene	2.25 μg/m^3	running annual mean	31.12.2003
Carbon monoxide Authorities in England, Wales and Northern Ireland only[a]	10.0 mg/m^3	maximum daily running 8-hour mean	31.12.2003
Authorities in Scotland only	10.0 mg/m^3	running 8-hour mean	31.12.2003
Lead	0.5 μg/m^3 0.25 μg/m^3	annual mean annual mean	31.12.2004 31.12.2008
Nitrogen dioxide[b]	200 μg/m^3 not to be exceeded more than 18 times a year 40 μg/m^3	1 hour mean annual mean	31.12.2005 31.12.2005
Particles (PM_{10}) (gravimetric)[c] All authorities	50 μg/m^3 not to be exceeded more than 35 times a year 40 μg/m^3	24 hour mean annual mean	31.12.2004 31.12.2004
Authorities in Scotland only[d]	50 μg/m^3 not to be exceeded more than 7 times a year 18 μg/m^3	24 hour mean annual mean	31.12.2010 31.12.2010
Sulphur dioxide	350 μg/m^3 not to be exceeded more than 24 times a year 125 μg/m^3 not to be exceeded more than 3 times a year 266 μg/m^3 not to be exceeded more than 35 times a year	1 hour mean 24 hour mean 15 minute mean	31.12.2004 31.12.2004 31.12.2005

a. Air Quality (Northern Ireland) Regulations 2003.
b. The objectives for nitrogen dioxide are provisional.
c. Measured using the European gravimetric transfer sampler or equivalent.
d. These 2010 Air Quality Objectives for PM_{10} apply in Scotland only, as set out in the Air Quality (Scotland) Amendment Regulations 2002.

2 Information used to support this assessment

This section lists the key information used in this review and assessment.

2.1 CONCLUSIONS FROM THE PREVIOUS ROUNDS OF REVIEW AND ASSESSMENT OF AIR QUALITY FOR ST ALBANS CITY AND DISTRICT COUNCIL

St Albans City and District Council has completed the following review and assessments of air quality to date:

Stage 3 Review and Assessment	(June 2000)
Stage 4 Review and Assessment	(January 2003)
Updating and Screening Assessment	(July 2003)
Air Quality Action Plan	(December 2003)
Detailed Assessment	(March 2004)
Progress Report	(August 2005)

The latest detailed assessment predicted that the UK annual average and hourly average objectives for nitrogen dioxide in 2005 would be exceeded at relevant receptor in the following areas:

- Isolated property next to the A4147, between the M1 and M10 south of M1 junction 7
- Peahen crossroads, central St Albans.

St Albans City and District Council currently has declared three AQMAs encompassing residential properties close in London Road St Albans, Hemel Hempstead Road and Frogmore (Appendix 3).

2.2 PROPOSED DEVELOPMENTS WHICH MAY AFFECT AIR QUALITY

Any new developments in the local authority area, or outside the LA that may impact on local air quality need to be considered. Key considerations should include the following:

2.2.1 Industry

There have been two new Part B industrial processes authorised in the St Albans City & District since the last Updating and Screening Assessment in July 2003. These include two new oil burners. The new processes were considered in the recent Progress Report and are considered not to lead to significant emission of air pollutants. The St Albans Hospital incinerator has closed since the Updating and Screening Assessment. There are therefore believed to be no new processes that would be significant to air quality.

2.2.2 Housing and redevelopment

There have been no new housing, commercial or public developments in St Albans since July 2003 which are likely to have a significant impact on air quality due to significantly changed traffic flows.

2.2.3 Road Network changes

No new roads have been constructed or proposed since the previous Updating and Screening Assessment (USA) in July 2003.

2.3 ROAD TRAFFIC DATA

This section summarises the information used in this report; more detailed information is given in Appendix 2. Appendix 2 lists the locations of the traffic flow and speed measurement points, flow and speed data and other relevant traffic statistics.

Data were collated from a range of sources, including:

- data provided by Hertfordshire County Council 2005
- data held in the National Atmospheric Emissions Inventory (NAEI, 2004) where no other data were available from either St Albans City and District Council or the Highways Agency.

Where no average speed data were available, estimated speeds based on speed limits were used near receptors and junctions. Speeds slower than the national speed limits have been assigned to sections of roads in areas close to junctions.

2.3.1 Fraction of HGVs

Where percentages of cars, LDVs, HGVs and buses were not provided by St Albans City and District Council, the percentage of HDVs was estimated.

2.3.2 Base year for traffic

The base year for the traffic flows was 2004 (NAEI) and 2005 (Hertfordshire County Council).

2.3.3 Traffic growth

Traffic growth figures were based on mid-range TEMPRO factors for St Albans City and District.

2.4 PART A AND B PROCESSES

There are no Part A and 17 Part B Industrial processes in St Albans City and District. A full list is given in Appendix 3.

2.5 AMBIENT MONITORING

2.5.1 Diffusion tubes

St Albans City and District Council carry out monitoring of nitrogen dioxide by diffusion tubes at 35 locations. The tubes used are analysed by Gradko Ltd using the 20% TEA in water method. The locations of the monitoring sites are shown in Figure 1.1. Full details of the type, locations, and concentrations recorded by the monitors are given in Appendix 1.

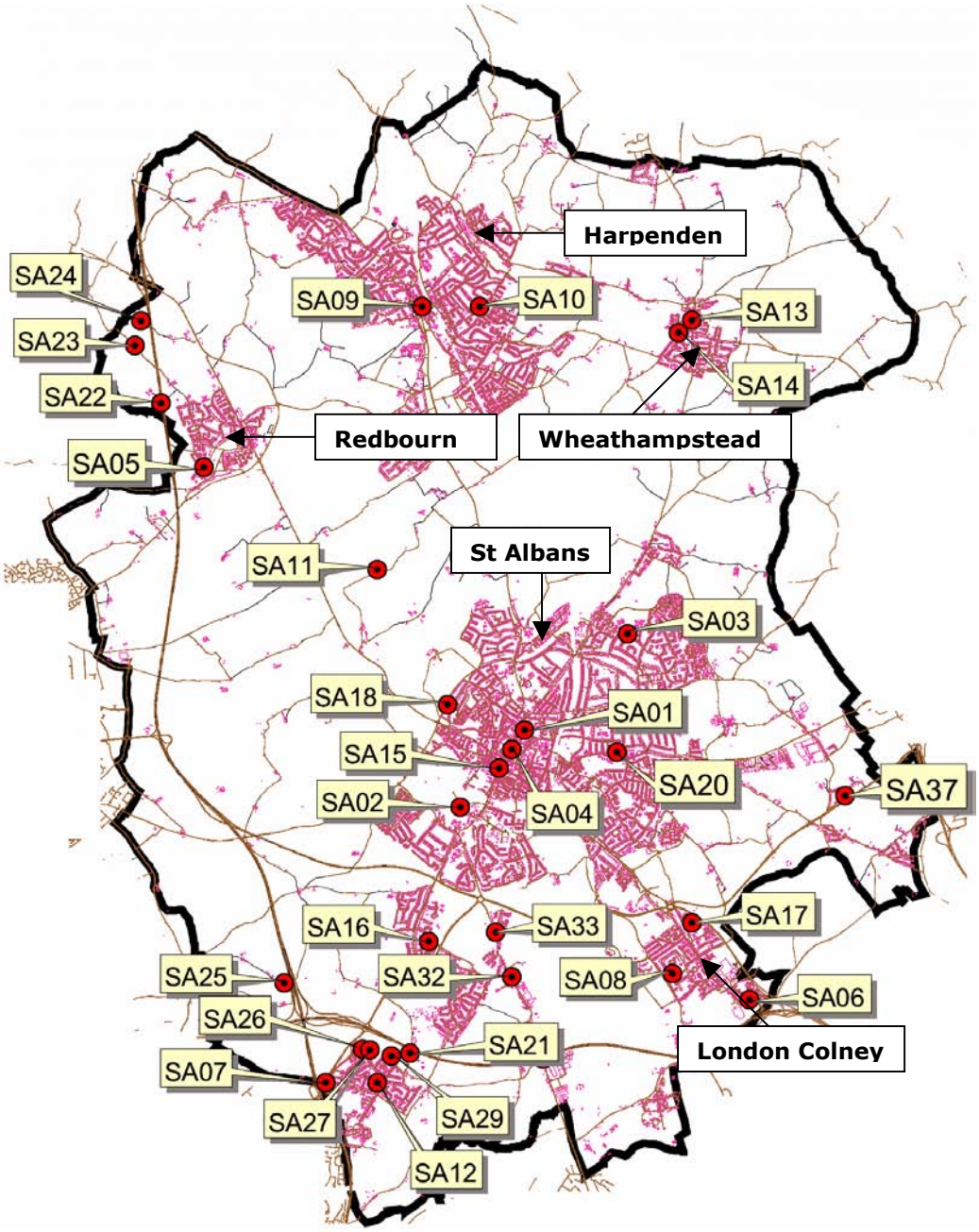

Figure 1.1 Diffusion Tube Monitoring Sites in St Albans City and District

2.5.2 Continuous monitoring

Continuous monitoring of NO_2 , PM_{10}, CO and SO_2 is undertaken at a monitoring site located at Fleetville Community Centre, Royal Road, St Albans. This is an urban background site approximately 100m from the A1057. The location of the monitoring site is shown in Figure 1.2.

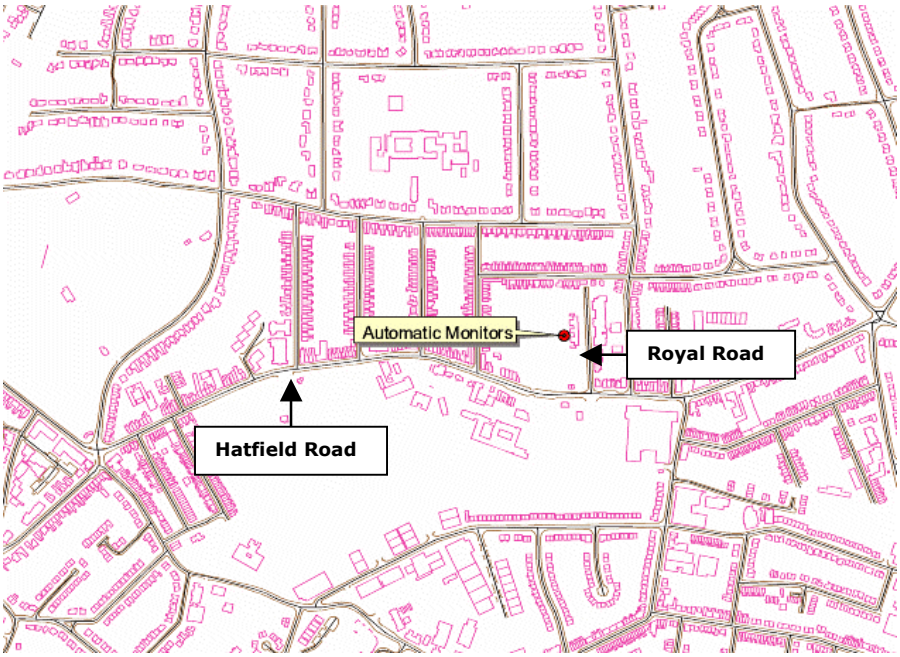

Figure 1.2 Automatic Monitoring Site in St Albans City and District

3 Updating and Screening Assessment for Carbon Monoxide

3.1 THE NATIONAL PERSPECTIVE

The main source of carbon monoxide in the United Kingdom is road transport, which accounted for 49% of total releases in 2003. Over the period 1970-2003 emissions decreased by 78% reflecting significant reduction in emissions from road transport, agricultural field burning and the domestic sector.

3.2 STANDARD AND OBJECTIVE FOR CARBON MONOXIDE

The Government and the Devolved Administrations adopted an 8-hour running mean concentration of 11.6 mgm^{-3} as the air quality standard for carbon monoxide. The new objective has been set at a slightly tighter level of 10 mgm^{-3} as a maximum daily running 8-hour mean concentration to have been achieved by the end of 2003, bringing it into line with the second Air Quality Daughter Directive limit value.

3.3 CONCLUSIONS OF THE SECOND ROUND OF REVIEW AND ASSESSMENT FOR CARBON MONOXIDE

The following conclusions were given for carbon monoxide in the earlier Updating and Screening Assessment for St Albans City and District Council:

- There are no roads in St Albans City and District which can be classified as 'very busy' according to the criteria in the guidance which have receptors within 10m of the kerbside ;
- Background and monitored concentrations in the District are very low compared with the Objective Level for 2003;
- St Albans City and District Council is not required to carry out a Detailed Review and Assessment for carbon monoxide;

3.4 SCREENING ASSESSMENT

3.4.1 Screening Assessment Checklist

The sources, data or locations which require assessment according to Technical Guidance LAQM TG(03) are considered in Table 3.1.

Table 3.1 Screening Assessment of Carbon Monoxide

Checklist Item (from Box 2.2 in LAQM.TG(03) update)	**Updating and Screening Assessment**
Monitoring data	Carbon monoxide is currently monitored in St Albans City and District at the Fleetville Community Centre (Section 3.4.3).
Very busy roads or junctions in built-up areas	Traffic flow data were supplied by St Albans City and District Council and taken from the NAEI. Based on these data, there are roads and Junctions in St Albans City and District which can be classified as 'very busy' according to the criteria in the guidance but none have relevant receptors within 10m

3.4.2 Background concentrations for carbon monoxide

The average background carbon monoxide concentration in St Albans City and District, estimated from the UK background maps[7] was 0.38 mgm^{-3} in (2001 estimate) with a maximum concentration of 0.43mgm^{-3} close to the London Road.

3.4.3 Automatic Monitoring

Carbon dioxide was monitored in St Albans City and District during 2005. The time series plot of hourly average CO concentrations is shown in Figure 3.1. The average concentration for 2005 recorded at the Fleetville site was 0.3 mgm^{-3} with a maximum concentration site of 3.1 mgm^{-3} The running 8 hour mean greater 10 mgm^{-3} air quality objective was not exceeded on 2005.

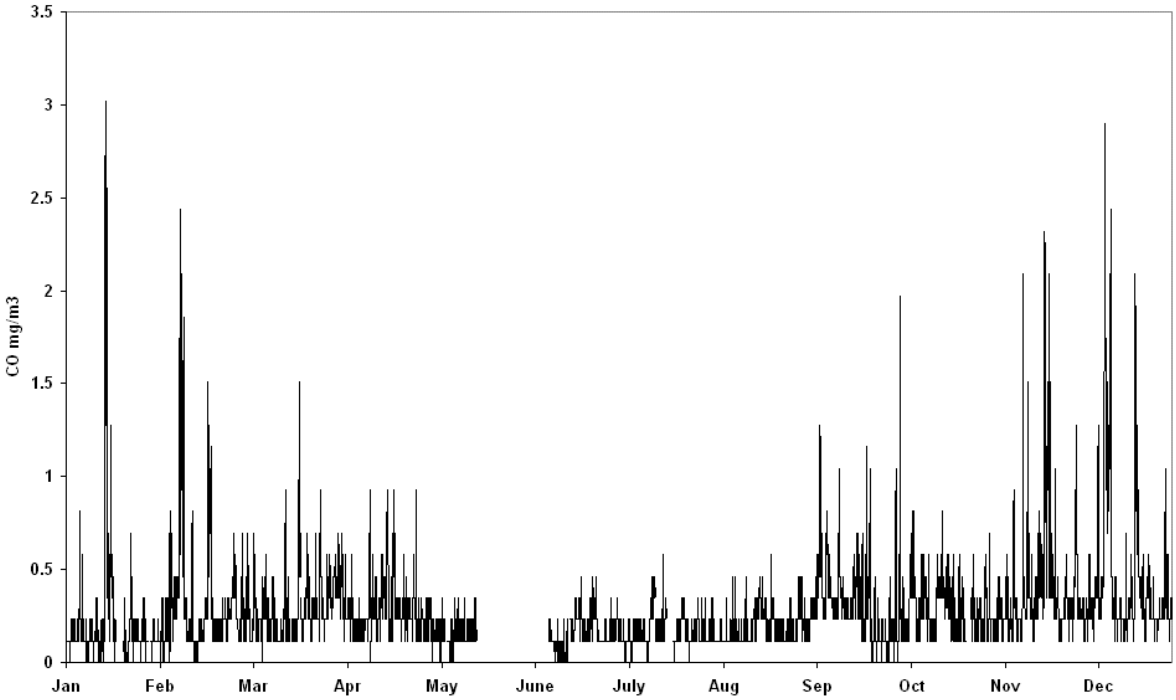

Figure 3.1 Time series of hourly average CO concentrations Fleetville 2005

3.5 CONCLUSIONS FOR CARBON MONOXIDE CONCENTRATIONS IN ST ALBANS CITY AND DISTRICT

Carbon dioxide was monitored in St Albans City and District during 2005 and monitored concentrations were well below the objective level. There are no roads in St Albans City and District which can be classified as 'very busy' according to the criteria in the guidance with relevant receptors within 10m .

A detailed assessment is not required for carbon monoxide in the St Albans City and District.

4 Updating and Screening Assessment for Benzene

4.1 THE NATIONAL PERSPECTIVE

The main sources of benzene emissions in the UK are petrol-engined vehicles, petrol refining, and the distribution and uncontrolled emissions from petrol station forecourts without vapour recovery systems. A number of policy measures already in place, or planned for future years, will continue to reduce emissions of benzene. Since January 2000, EU legislation has reduced the maximum benzene content of petrol to 1%, from a previous upper limit of 5%. The European Auto-Oil programme will further reduce emissions for cars and light-duty vehicles, and emissions of benzene from the storage and distribution of petrol are controlled by vapour recovery systems. Forecasts based on national mapping suggest that the policy measures currently in place will achieve the 2003 objective at all urban background and roadside/kerbside locations. Whilst the 2010 objectives are expected to be met at all urban background, and most roadside locations, there is the possibility for some remaining exceedances, which will require additional measures at a local level.

4.2 STANDARD AND OBJECTIVE FOR BENZENE

The Government and the Devolved Administrations adopted a running annual mean concentration of 16.25 μgm^{-3} as the air quality standard for benzene, with an objective for the standard to have been achieved by the end of 2003. However, in light of the health advice from EPAQS and the Department of Health's Committee on Carcinogenicity of Chemicals in Food, Consumer Products and the Environment (COC) to reduce concentrations of benzene in air to as low a level as possible, additional tighter objectives have also been set. The additional objective is for an annual mean of 5 μgm^{-3} to be achieved by the end of 2010 in England and Wales. In Scotland and Northern Ireland, a running annual mean of 3.25 μgm^{-3} has been adopted as an additional objective, to be achieved by the end of 2010.

4.3 CONCLUSIONS OF THE SECOND ROUND OF REVIEW AND ASSESSMENT FOR BENZENE

The following conclusions were given for benzene in the earlier Updating and Screening Assessment for St Albans City and District Council.

- There are no petrol stations with a throughput greater than 2 million litres on or near busy roads and with relevant exposure within 10m of the pumps;

- There are no major fuel storage depots in the district. However, Buncefield storage depot, located mainly in the adjoining Dacorum district, is at the boundary with St Albans City and District. A few isolated houses are located in St Albans City and District near the depot which is within 1 km of the M1.

netcen considers that annual concentrations of benzene in St Albans are likely to be below the objectives but recommends further benzene monitoring at closest receptors around the storage depot.

St Albans City and District Council is not required to carry out a Detailed Review and Assessment for benzene.

4.4 SCREENING ASSESSMENT OF BENZENE

4.4.1 Screening Assessment Checklist

The sources, data or locations which require assessment according to Technical Guidance LAQM TG(03) are considered in Table 4.1.

Table 4.1 Screening Assessment of Benzene

Checklist Item (from Box 3.2 in TG(03) update)	**Updating and Screening Assessment**
Monitoring data outside an AQMA	A benzene monitoring study was undertaken in 2004 -2005 (Section 4.4.3)
Monitoring data within an AQMA	No monitoring of Benzene has been undertaken with the currently declared AQMAs.
Very busy roads or junctions in built up areas	Traffic flow data were supplied by St Albans City and District Council and also taken from the NAEI. Based on these data, there are no roads or junctions in St Albans City and District which can be classified as 'very busy' according to the LAQM TG(03) updated checklist with relevant receptors within 10m.
New industrial sources.	There are no new industrial sources established since the last Review and Assessment with the potential to emit benzene. There are no industrial sources in St Albans City and District with increased emissions since the last Review and Assessment.
Industrial sources with substantially increased emissions, or new relevant exposure	
Petrol stations	There are no petrol stations meeting the criteria in the LAQM TG(03) updated checklist which have not been considered in previous reports.
Major fuel storage depots (petrol only)	There is a major fuel storage depot close the boundary on St Albans City and District Section (Section 4.4.4).

4.4.2 Background concentrations for benzene

The average background benzene concentration in St Albans City and District, estimated from the UK background maps[7] was 0.52 μgm^{-3} in 2003 with a maximum concentration of 0.68 $\mu gm^{-3.}$. The estimated average background benzene concentration was 0.40 μgm^{-3} in 2010 with a maximum concentration of 0.51 $\mu gm^{-3.}$. The maximum concentration was estimated close to the A1057 Hatfield Road.

4.4.3 Benzene Monitoring

Monitoring of Benzene was undertaken for six months from September 2004 at six sites in St Albans. A table of monthly average concentrations is shown in Appendix 1. The maximum monthly concentration recorded was 2.1 μgm^{-3} at a roadside site in Holywell Hill ST Albans. The results indicate that the 2010 objective level of 5 μgm^{-3} is unlikely to be exceeded at any locations in St Albans City and District.

4.4.4 Screening assessment of Fuel Storage Depots

There is a major fuel storage depot at Buncefield*[2] in neighbouring Dacorum Borough. Dacorum holds no benzene emission data for the Buncefield terminal. It is likely that any emissions from the site are likely to be discharges at low height with a mixture of vented and fugitive emissions. Consequently, any contribution to ambient benzene concentration is likely to be most significant in the vicinity of the storage terminal. Measurements of benzene by diffusion tube at Cherry Tree Farm, located within 1 km of the storage terminal in St Albans City and District, indicated a monthly maximum concentration of 1.2 μgm^{-3} between August 2004 and January 2005. The

[2] The Buncefield depot was destroyed in a major explosion in December 2005 and the future of this facility is uncertain at the time of this report.

monthly mean concentrations determined at Cherry Tree Farm, which is close to the depot, suggest that annual concentrations are likely to be below the 2003 and 2010 objectives for benzene. However, it should be noted that there are sites with relevant exposure in St Albans City and District within about 200 m of the depot and continued monitoring at such receptors would be recommended.

4.5 CONCLUSIONS FOR BENZENE CONCENTRATIONS ST ALBANS CITY AND DISTRICT

There are no very busy roads or junctions in St Albans with relevant exposure within the criteria specified in the guidance that have not been considered in previous rounds of Review and Assessment

There are no petrol stations with a throughput greater than 2 million litres adjacent to busy roads.

There are no industrial processes within the district which are considered to be significant emitters of benzene. A fuel storage depot is located in Dacorum district on the outskirts of Hemel Hempstead at the western boundary of St Albans City and District. Annual concentrations of benzene in St Albans are likely to be below the objectives but further benzene monitoring at receptors around the Buncefield storage depot is recommended.

St Albans City and District Council is not required to carry out a Detailed Review and Assessment for benzene.

5 Updating and Screening Assessment for 1,3-Butadiene

5.1 THE NATIONAL PERSPECTIVE

The main source of 1,3-butadiene in the United Kingdom is emissions from motor vehicle exhausts. 1,3-butadiene is also an important industrial chemical and is handled in bulk at a small number of industrial premises. Maximum running annual mean concentrations of 1,3-butadiene measured at all urban background/centre and roadside locations in the national network are already well below the 2003 objective of 2.25 μgm^{-3}. The increasing numbers of vehicles equipped with three way catalysts will significantly reduce emissions of 1,3-butadiene in future years. Recently agreed further reductions in vehicle emissions and improvements to fuel quality, are expected to further reduce emissions of 1,3-butadiene from vehicle exhausts. These measures are expected to deliver the air quality objective by the end of 2003.

5.2 STANDARD AND OBJECTIVE FOR 1,3-BUTADIENE

The Government and the Devolved Administrations adopted a maximum running annual mean concentration of 2.25 μgm^{-3} as an air quality standard for 1,3-butadiene. The objective is for the standard to have been achieved by the end of 2003.

5.3 CONCLUSIONS OF THE SECOND ROUND OF REVIEW AND ASSESSMENT FOR 1,3-BUTADIENE

The following conclusions were given for 1,3-butadiene in the earlier Updating and Screening Assessment for St Albans City and District Council:

- Estimated background concentrations and data from national monitoring stations indicate that the objective for 1,3-butadiene is likely to be achieved by the end of 2003;
- There are no industrial processes in the District, or close to its boundary, which have the potential to emit significant quantities of benzene;

St Albans City and District Council is not required to carry out a Detailed Review and Assessment for 1,3-butadiene.

5.4 SCREENING ASSESSMENT OF 1,3-BUTADIENE

5.4.1 Screening Assessment Checklist

The sources, data or locations which require assessment according to Technical Guidance LAQM TG(03) are considered in Table 5.1.

Table 5.1 Screening Assessment of 1,3-butadiene

Checklist Item (from Box 4.2 in TG(03) update)	Updating and Screening Assessment
Monitoring data	1,3-butadiene is not currently monitored in St Albans City and District
New industrial sources.	There are no new industrial sources established since the last Review and Assessment with the potential to emit 1,3-butadiene. There are no industrial sources in St Albans City and District with increased emissions since the last Review and Assessment.
Industrial sources with substantially increased emissions, or new relevant exposure	

5.4.2 Background Concentrations for 1,3-Butadiene

The average background 1,3-butadiene concentration in St Albans City and District, estimated from the UK background maps[7] was 0.21 μgm^{-3} in 2003 with a maximum concentration of 0.26 μgm^{-3}. The maximum concentration was estimated at Chiswell Green close to the M10.

5.5 CONCLUSIONS FOR 1,3-BUTADIENE CONCENTRATIONS IN ST ALBANS CITY AND DISTRICT COUNCIL AREA

Estimated background concentrations and data from national monitoring stations indicate that the objective for 1,3-butadiene is likely to be achieved by the end of 2003.

The emissions from industrial processes in St Albans City and District which have the potential to emit 1,3-butadiene are likely to be very small and therefore there is little likelihood of exceedances of the air quality objective for 1,3-butadiene.

A detailed assessment is not required for 1,3-butadiene in St Albans City and District.

6 Updating and Screening Assessment for Lead

6.1 THE NATIONAL PERSPECTIVE

The agreement reached between the European Parliament and the Environment Council on the Directive on the Quality of Petrol and Diesel Fuels (part of the Auto-Oil Programme) has led to the ban on sales of leaded petrol in the United Kingdom with effect from 1 January 2000. Emissions of lead are now restricted to a variety of industrial activities, such as battery manufacture, pigments in paints and glazes, alloys, radiation shielding, tank lining and piping.

Detailed assessments of the potential impact of lead emissions from industrial processes have been undertaken by the Government and the Devolved Administrations, based upon both monitoring and sector analysis studies. The former has included a 12-month monitoring survey in the vicinity of 30 key industrial sites in the UK, which has been used to supplement information already provided from the non-automatic monitoring networks. These monitoring data have generally indicated no exceedances of the 2004 or 2008 objectives, although locations in proximity to non-ferrous metal production and foundry processes were deemed to be at risk.

6.2 STANDARD AND OBJECTIVE FOR LEAD

The Government and the Devolved Administrations adopted an annual mean concentration of 0.5 μgm^{-3} as the air quality standard for lead, with an objective for the standard to have been achieved by the end of 2004. In addition, a lower air quality objective of 0.25 μgm^{-3} to be achieved by the end of 2008 has also been set.

6.3 CONCLUSIONS OF THE SECOND ROUND OF REVIEW AND ASSESSMENT FOR LEAD

The following conclusions were given for lead` in the earlier Updating and Screening Assessment for St Albans City and District Council:

> No Part A or Part B processes in the district are considered to be sources of lead.

St Albans City and District Council is not required to carry out a Detailed Review and Assessment for lead.

6.4 SCREENING ASSESSMENT OF LEAD

The sources, data or locations which require assessment according to Technical Guidance LAQM TG(03) are considered in Table 6.1.

Table 6.1 Screening Assessment of Lead

Checklist Item (from Box 5.1 in TG(03) update)	Updating and Screening Assessment
Monitoring data	Lead is not currently monitored in St Albans City and District
New industrial sources.	There are no new industrial sources in St Albans City and District which emit lead. The only significant source of Lead in the vicinity of St Albans is the British Lead Mills in Welwyn Garden City. This was considered in the previous round of review and assessment and the impact on St Albans of emission from this plant were not considered to be significant. Reported emission levels have decreased from 265 kg in 2001 to 185 kg in 2004.
Industrial sources with substantially increased emissions, or new relevant exposure	

6.5 CONCLUSIONS FOR LEAD CONCENTRATIONS IN ST ALBANS CITY AND DISTRICT

Emissions of lead from industrial processes in St Albans and surrounding districts are highly unlikely to cause exceedances of the air quality objectives for lead in 2008.

A detailed assessment is not required for lead in St Albans City and District.

7 Updating and Screening Assessment for Nitrogen Dioxide

7.1 INTRODUCTION

The principal source of NO_x emissions is road transport, which accounted for about 40% of total UK emissions in 2003. Major roads carrying large volumes of high-speed traffic (such as motorways and other primary routes) are a predominant source, as are conurbations and city centres with congested traffic. Within most urban areas, the contribution of road transport to local emissions will be much greater than for the national picture.

Meeting the annual mean objective for 2005, and the corresponding limit value in 2010, is considerably more demanding than achieving the 1-hour objective. By 2005, the annual mean objective was being achieved at all urban background locations outside of London, but being exceeded more widely at roadside sites throughout the UK in close proximity to busy road links. Projections for 2010 indicate that the EU limit value may still be exceeded at urban background sites in inner London, and at roadside locations in other cities.

7.2 STANDARDS AND OBJECTIVES FOR NITROGEN DIOXIDE

The Government and the Devolved Administrations have two Air Quality Objectives for nitrogen dioxide, as an annual mean concentration of 40 μgm^{-3}, and a 1-hour mean concentration of 200 μgm^{-3} ,not to be exceeded more than 18 times per year. The objectives are to have been achieved by the end of 2005.

7.3 CONCLUSIONS OF THE SECOND ROUND OF REVIEW AND ASSESSMENT FOR NITROGEN DIOXIDE

The following conclusions were given for nitrogen dioxide in the earlier Updating and Screening Assessment for St Albans City and District Council:

- No significant industrial sources of nitrogen dioxide were determined. The St Albans bus station is unlikely to cause exceedance of the annual mean nitrogen dioxide objective at nearby relevant exposure.

- Air quality monitoring data for 2001 and 2002 indicates exceedances of the 2005 objective at several sites :

  SA01 - Hatfield Road, St Albans (kerbside)
  SA06 - Barnet Road, London Colney
  SA07 - Waterdale, Bricket Wood
  SA09 - High Street, Harpenden (kerbside)
  SA15 - Holywell Hill, St Albans (kerbside)
  SA21 - Lye lane, Bricket Wood
  SA22 - Lybury lane, Redbourn

- St Albans City and District Council needs to undertake detailed assessments for nitrogen dioxide at the two background sites (SA06 and SA22). It is believed that the kerbside sites are not at areas of relevant exposure however, further monitoring should be considered at relevant exposure near the Holywell Hill site where the highest concentrations of nitrogen dioxide were determined. The DMRB model predicts high nitrogen dioxide concentrations at three road junctions :

The A5183 and A1081 in St Albans
Isolated property within the A4147, M1 and M10

St Albans City and District Council needs to undertake detailed assessments for nitrogen dioxide at these locations.

The Detailed Assessment recommended AQMAs be declared in the following areas:

- Peahen Crossroads, Central St Albans
- M1 Junction 7 with M10

AQMAS are currently declared for NO_2 in St Albans City and District at the following locations (Appendix 5):

- AQMA 1 London Road St Albans
- AQMA 2 Beechtree Cottages Hemel Hempstead
- AQMA 7 Frogmore and Colney Street in the Vicinity of the M25

7.4 SCREENING ASSESSMENT OF NITROGEN DIOXIDE

The sources, data or locations which require assessment according to Technical Guidance LAQM TG(03) are considered in Table 7.1.

Table 7.1 Screening Assessment of NO_2

Checklist Item (from Box 6.2 in TG(03) update)	**Updating and Screening Assessment**
Monitoring data outside an AQMA	Monitoring is undertaken at sites across the district (section 7.6)
Monitoring data within an AQMA	Monitoring is currently undertaken using diffusion tubes within two of the AQMAs in St Albans City and District (section 7.6.4.)
Narrow congested streets with residential properties close to the kerb	No streets in this category have been identified in St Albans.
Junctions.	Annual average nitrogen dioxide concentrations at receptors near busy road junctions in St Albans City and District were assessed in the previous Updating and Screening Assessments for 2005 and 2010. There has been no significant increase in traffic flows recorded at any of the junctions.
Busy streets where people may spend 1-hour or more close to traffic	No streets in this category have been identified in St Albans.
Roads with high flow of buses and/or HGVs.	There are no roads identified in St Albans with high (>20%) flows of buses or HGVs.
New roads constructed or proposed since the previous round of R&A	No new roads have been constructed or proposed since the last round of Review and Assessment.
Roads with significantly changed traffic flows, or new relevant exposure	There have been no significant changes in traffic flows or exposure on A roads and motorways in St Albans City and District since the last Updating and Screening Assessment.
Bus Stations	The bus station in St Albans City was considered in the previous updating and screening assessment. The bus movements are greater than 1000 per day but there is no relevant exposure within 20m
New industrial sources.	There are no new industrial sources in St Albans which have the potential to emit nitrogen dioxide. There are no Part A processes in St Albans. Based on the information available, none of the Part B industrial processes in St Albans have increased emissions or new relevant exposure.
Industrial sources with substantially increased emissions, or new relevant exposure	
Aircraft	There are no major airports in the district. The nearest major airport is Luton airport which is about 4 km northwest of the district.

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7.5 BACKGROUND CONCENTRATIONS FOR NITROGEN DIOXIDE

The estimated average background NO_2 concentration for St Albans City and District in 2005 from UK Background maps[7] was 19.0 μgm^{-3} with a maximum concentration of 29.8 μgm^{-3}. The estimated average background NO_2 concentration in 2010 was 16.2 μgm^{-3} with a maximum concentration of 24.3 μgm^{-3}. The maximum concentrations were estimated for a location close to Junction 21A of the M25.

7.6 SCREENING ASSESSMENT OF MONITORING DATA

7.6.1 Diffusion tube monitoring

Diffusion tubes at 32 sites are operated by St Albans City and District Council (Appendix A table 1.1). Triplicate tubes are co-located with the automatic monitor at Fleetville Centre. Table 7.1 shows annual average nitrogen dioxide concentrations at sites in St Albans City and District for 2005, with estimates of likely concentrations in 2010.

7.6.2 Bias correction of diffusion tube data

Diffusion tubes were co-located with the continuous monitor at the Fleetville Centre site during 2005. The bias adjustment factor was calculated using the netcen spreadsheet for calculating the precision and accuracy of diffusion tubes. This provides a bias adjustment factor of 0.97. The diffusion tube results have been multiplied by this adjustment factor (the bias correction factor obtained from the UWE spreadsheet was 0.99 for 2005 based on 9 studies and therefore in good agreement with the local factor).

Table 7.2 Bias corrected annual average NO_2 concentrations at sites in St Albans City and District in 2005 (μgm^{-3})

Type	Code	Address	Annual Mean Bias adjusted 2005	Prediction for 2010
R	SA01	Museum of St Albans, Hatfield Road	35.4	29.7
B	SA02	Holywell Hill, St Albans	25.3	22.0
B	SA03	St Peters Street, St Albans	29.6	24.9
B	SA04	Pondfield Crescent Marshalswick St Albans	22.2	19.3
B	SA05	Ben Austins, Redbourn	24.1	20.2
B	SA06	Ridgeview Hostel, Barnet Road, London Colney	32.7	27.5
B	SA07	Waterdale, Bricket Wood	**42.0**	35.3
B	SA08	Bowmans Green JMI, Telford Rd, London Colney	30.6	26.6
R	SA09	High Street, Harpenden	38.0	31.9
B	SA10	Crabtree Lane, Harpenden	25.0	21.8
B	SA11	Redbourn JMI, Crouch Hall Lane, Redbourn	25.3	22.0
B	SA12	Ashridge Drive, Bricket Wood	28.7	25.0
R	SA13	Wheathampstead High Street	27.5	23.1
B	SA14	Adult Ed. Centre, Butterfield, Wheathampstead	22.1	19.2
R	SA15	Peahen PH, Holywell Hill, St Albans	**51.3**	**43.1**
B	SA16	Tippendell Lane, St Albans	30.7	26.7
B	SA17	London Colney Roundabout	32.8	28.6
B	SA18	Batchwood Drive, St Albans	24.9	20.9
B	SA20	Fleetville C. Centre 1, Royal Rd, St Albans (SA1)	25.8	22.4
B	SA21	Lye Lane, Bricket Wood	38.4	33.4
B	SA22	Lybury Lane	**42.9**	37.3
B	SA23	St Agnells	26.9	23.4
B	SA24	Redding Lane	26.6	23.2
B	SA25	Searches Farm	36.7	32.0
B	SA26	Oakwood Road	35.6	30.9
B	SA27	Five Acres Avenue, Bricket Wood	31.2	27.1
B	SA29	Meadow Close, Bricket Wood	32.4	28.2
B	SA30	Smug Oak Lane	**43.8**	38.1
B	SA31	Radlett Road	**44.0**	37.0
B	SA32	Sycamore Drive, Park Street	35.0	30.5
K	SA33	Mount Drive, Park Street	**42.0**	36.5
B	SA34	Fleetville C. Centre 2, Royal Rd, St Albans (SA1)	26.6	23.1
B	SA35	Fleetville C. Centre 3, Royal Rd, St Albans (SA1)	25.8	22.4
B	SA37	Sleapcross Gardens	35.0	30.5

K=Kerbside
R=Roadside
B=Background

From Guidance LAQM TG(03) the adjustment factor to estimate annual average concentrations in 2010 from 2005 data is 0.87 for background sites and 0.84 for roadside sites .

7.6.3 Diffusion tube analysis

It can be seen from Table 7.1 that bias corrected concentrations in 2005 were above the objective annual mean limit value of 40 μgm^{-3} at six sites:

SA 07 Waterdale Bricket Wood (M1)
SA 15 Peahen PH Holywell Hill St Albans
SA 22 Lybury Lane Redbourn (M1)
SA 30 Smug Oak Lane Bricket Wood (M25)
SA 31 Radlett Road (M25)
SA 33 Mount Drive Park Street

Concentrations are predicted to still exceed 40 μgm^{-3} at the Holywell Hill site in 2010.

- Diffusion tubes SA 15, SA 30 and SA 31 are within existing AQMAs (section 7.6.4).
- The area of Lybury Lane Redbourn (SA 22) was considered in the 2004 Detailed Assessment and it was concluded that there were no relevant receptors in the areas of exceedence and that no further action was necessary.
- The Bricket Wood Area (SA 07) is within a revoked AQMA. The area was remodelled for the Stage 4 Assessment. This assessment concluded that no exceedances were likely at relevant locations in Bricket Wood.
- Mount Drive/Park Street (SA 33); This is a kerbside site and the nearest receptor is 36m away. Using the factor of 0.75 to as given in the Air Quality Review and Assessment website the concentration at the nearest building facade is estimated to be 31.5 μgm^{-3} .

7.6.4 Monitoring within AQMAs

Monitoring for NO_2 using diffusion tubes is currently undertaken at two site within AQMA 7 (Frogmore and Colney Street) and at one location on the edge of AQMA 1 (London Road St Albans)

The biased corrected concentrations for 2005 are as follows:

Location	**AQMA No**	**NO_2 Annual Mean Bias adjusted 2005 μgm^{-3}**
SA30 Smug Oak Lane	7	43.8
SA 31 Radlett Road	7	44.0
SA 15 Peahen Pub	1	51.3

The measured concentrations in these AQMAs are above the annual mean objective for 2005 and therefore the AQMAS should remain in place.

7.6.5 Automatic Monitoring

Nitrogen dioxide is monitored using a chemiluminescent monitor at the Fleetville Centre site. The time series plot of hourly average NO_2 concentrations in 2005 is shown in Figure 7.1.

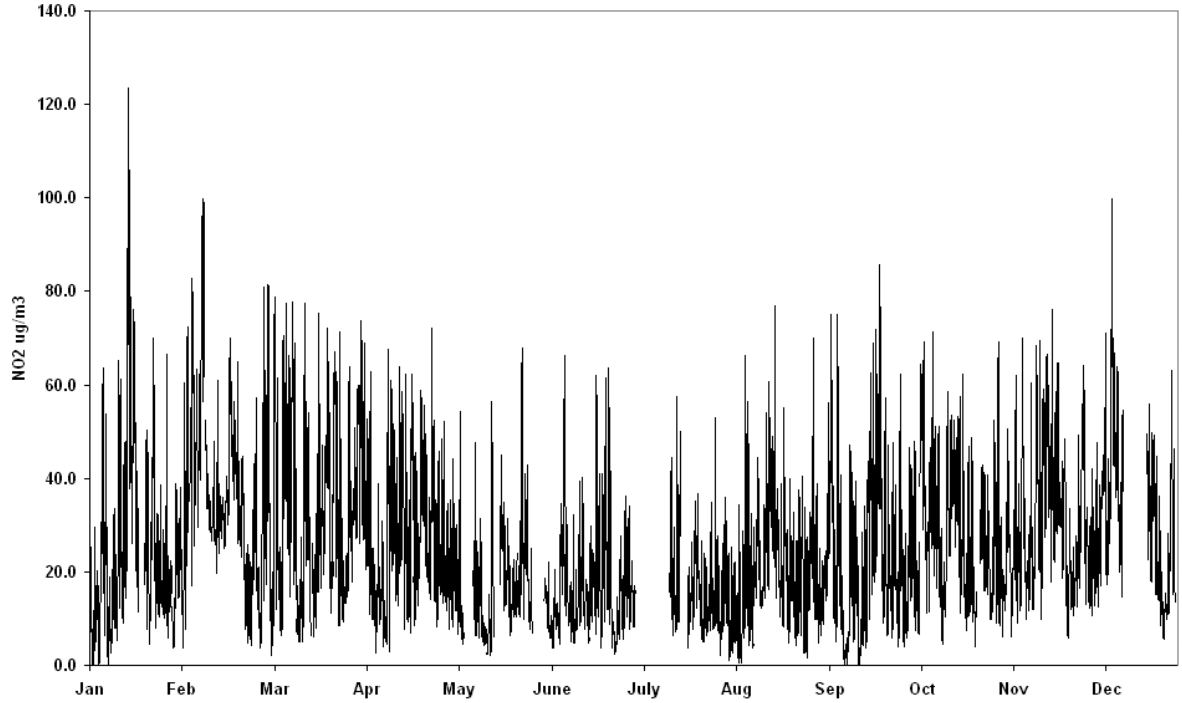


Figure 7.1 Time series of hourly average NO_2 concentrations Fleetville 2005

The annual average concentration recorded at the Fleetville site was 25.9 μgm^{-3} with a maximum one-hour concentration of 123 μgm^{-3}.

7.7 SCREENING ASSESSMENT OF ROAD TRAFFIC SOURCES

An initial screening assessment was undertaken using DMRB for A roads and motorways in St Albans using data taken from the NAEI. Traffic speeds and receptor distance were selected to provide "worst case" estimates. Table 7.3 shows that annual mean concentrations in excess of 40 μgm^{-3} were predicted at receptors close the M1, M10 and M25 motorways.

Table 7.3 Annual average NO_2 concentrations estimated using NAEI data

Road name	Receptor Distance (m)	AADT 2005 (combined veh/day)	average speed (km/h)	Total % HDV	NO2 (μgm^{-3})	
					2005	2010
M10	15	25548	95	10.3	30.8	25.4
A5183	5	20792	80	3.4	28.5	23.3
A5183	5	12028	51	4.6	26.4	22.4
A1081	5	16153	80	3.5	22.6	18.2
A1057	5	16975	51	6.3	23.3	18.3
A5183	5	16294	80	3.2	22.5	18.1
A1081	5	14352	51	8.1	29.1	24.7
A414	10	40383	80	8.1	26.7	20.8
A4147	5	28145	51	2.8	25.8	21.6
M1	15	174618	113	13.2	**44.7**	36.1
A5	10	24361	113	10.6	33.8	27.4
A5183	5	17492	80	3.4	25.6	21.7
A1081	5	21133	51	2.9	24.3	20.6
A1081	5	24171	51	10.6	27.2	21.3
A405	5	25495	80	8.4	30.8	25.4
M25	15	100297	113	16.0	**44.7**	36.0
M1	15	136587	113	14.0	**42.7**	34.5
A1081	5	18964	51	3.1	26.1	22.2
A4147	5	10425	51	2.5	22.9	19.9
M25	15	122564	113	16.3	**46.6**	37.6
M1	15	149070	113	13.7	**45.6**	36.7
A1081	5	15543	51	3.0	25.8	21.9
A414	10	51715	80	7.5	32.3	26.5
A5183	5	8092	51	2.6	22.2	19.3
M1	15	146784	113	14.2	**43.9**	35.4
A5183	5	25506	80	2.4	23.2	19.5
A1081	5	17173	80	2.6	24.5	20.5
A4147	5	10639	80	3.7	29.1	23.9
M1	15	48129	113	8.0	34.1	27.8
A5	10	24363	113	10.6	33.8	27.4
A1081	5	15762	51	3.4	23.2	19.9
A1081	5	19262	51	2.9	23.8	20.3
A5183	5	12435	80	7.7	27.4	23.0
A405	5	25922	80	8.7	31.2	25.8
A1057	5	10270	51	5.6	25.4	21.7
A1081	5	10192	51	3.4	24.1	20.8
A5183	5	18007	51	3.9	27.4	23.2

The road links where exceedences were predicted have been re-examined using actual receptor distances determined from OS Landline GIS maps (Table 7.4).

Table 7.4 Annual average NO_2 concentrations estimated using NAEI data

Road name	East	North	Receptor Distance (m)	AADT 2005 (combined veh/day)	average speed (km/h)	Total % HDV	NO2 (μgm^{-3}) 2005
M1	509757	207000	215	174618	113	13.2	24.8
M25	512500	203110	273	100297	113	16.0	23.7
M1	509100	215300	193	136587	113	14.0	25.1
M25	516216	202781	38	122564	113	16.3	38.5
M1	516216	202781	39	149070	113	13.7	38.2
M1	509175	207600	36	146784	113	14.2	39.0

There are no exceedences predicted for 2005 at the closest receptors to locations examined near the M1 and M25.

7.7.1 Busy Junctions

The following roads and junctions were identified as areas of high traffic volumes with potential for public exposure. These roads been examined using DMRB with traffic data from Hertfordshire County Council or the NAEI. Tables 7.5 and 7.6 show NO_2 concentrations at the nearest receptors to the junctions. Receptor distance were measured using the OS Landline maps for the District

Table 7.5 Annual average NO_2 concentrations at road junctions in St Albans City and District 2005

Location	Junction	East	North	AADT 2005	%HDV	NO_2 (μgm^{-3})
St Albans	A5183 Holywell Hill	514900	206940	19082	3.7	35.9
	A1081 London Road			25842	4.0	
St Albans	A 5183 Watling Street	514200	205200	16152	4.0	24.2
	A414 North Orbital Road			43209	4.0	
St Albans	A4147 Bluehouse Hill	513150	206720	23923	4.0	26.5
	C98 King Harry Lane			17473	4.0	
St Albans	C62 Batchwood Drive	514300	208500	16919	4.0	31.0
	A1081 Harpenden Road			16751	4.0	
Redbourn	M1 Junction 9	509500	214500	137272	15.8	25.2
	A5183 Redbourn Road			14616	4.0	
Hemel Hempstead	M1 Junction 8	508600	207500	137272	15.8	32.3
	A414 Breakspear Way			48845	4.0	

Table 7.6 Annual average NO_2 concentrations at road junctions in St Albans City and District 2010

Location	Junction	East	North	AADT 210	%HDV	NO_2 (μgm^{-3})
St Albans	A5183 Holywell Hill	514900	206940	20418	3.7	28.0
	A1081 London Road			27651	4.0	
St Albans	A 5183 Watling Street	514200	205200	17283	4.0	20.9
	A414 North Orbital Road			46234	4.0	
St Albans	A4147 Bluehouse Hill	513150	206720	25598	4.0	26.5
	C98 King Harry Lane			18696	4.0	
St Albans	C62 Batchwood Drive	514300	208500	18103	4.0	25.1
	A1081 Harpenden Road			17924	4.0	
Redbourn	M1 Junction 9	509500	214500	146881	15.8	20.4
	A5183 Redbourn Road			15639	4.0	
Hemel Hempstead	M1 Junction 8	508600	207500	146881	15.8	26.5
	A414 Breakspear Way			52264	4.0	

The DMRB study indicate that there are no junctions where the NO_2 objectives are likely to exceeded**.**

7.8 CONCLUSIONS FOR NITROGEN DIOXIDE CONCENTRATIONS IN ST ALBANS CITY AND DISTRICT

No roads or busy junctions were identified using DMRB where the objectives were likely to be exceeded.

NO_2 concentrations in 2005 measured using diffusion tubes were above the objective annual mean limit value of 40 μgm^{-3} at six sites:

SA 07 Waterdale Bricket Wood (M1)
SA 15 Peahen PH Holywell Hill St Albans
SA 22 Lybury Lane Redbourn (M1)
SA 30 Smug Oak Lane Bricket Wood (M25)
SA 31 Radlett Road (M25)
SA 33 Mount Drive Park Street

The conclusions for these areas are as follows:

- Diffusion tubes SA 15, SA 30 and SA 31 are within existing AQMAs.
- The area of Lybury Lane Redbourn (SA 22) was considered in the 2004 Detailed Assessment and it was concluded that there were no relevant receptors in the areas of exceedence and that no further action was necessary.
- The Bricket Wood Area (SA 07) is within a revoked AQMA. The area was remodelled for the Stage 4 Assessment. This assessment concluded that no exceedances were likely at relevant locations in Bricket Wood.
- Mount Drive/Park Street (SA 33); This is a kerbside site and the nearest receptor is 36m away. Using the factor of 0.75 to as given in the Air Quality Review and Assessment website the concentration at the nearest building facade is estimated to be 31.5 μgm^{-3} .

A detailed assessment is not required for nitrogen dioxide in St Albans City and District.

8 Updating and Screening Assessment for Sulphur Dioxide

8.1 INTRODUCTION

The main source of sulphur dioxide in the United Kingdom is power stations, which accounted for more than 69% of emissions in 2003. There are also significant emissions from other industrial combustion sources. Domestic sources now only account for 4% of emissions, but can be locally much more significant. Road transport currently accounts for less than 1% of emissions.

Local exceedances of the objectives (principally the 15-minute mean objective) may occur in the vicinity of small combustion plant (less than 20 MW), which burn coal or oil, in areas where solid fuels are the predominant form of domestic heating, and in the vicinity of major ports.

8.2 STANDARD AND OBJECTIVE FOR SULPHUR DIOXIDE

The Government and the Devolved Administrations adopted a 15-minute mean of 266 μgm^{-3} as an air quality standard for sulphur dioxide, with an objective for the standard not to be exceeded more than 35 times in a year by the end of 2005.

Additional objectives have also been set which are equivalent to the EU limit values specified in the First Air Quality Daughter Directive. These are for a 1-hour mean objective of 350 μgm^{-3}, to be exceeded no more than 24 times per year, and a 24-hour objective of 125 μgm^{-3}, to be exceeded no more than 3 times per year, to have been achieved by the end of 2004.

8.3 CONCLUSIONS OF THE FIRST ROUND OF REVIEW AND ASSESSMENT FOR SULPHUR DIOXIDE

The following conclusions were given for sulphur dioxide in the earlier Updating and Screening Assessment for St Albans City and District Council:

- There are no significant industrial sources of sulphur dioxide in St Albans City and District or close to its boundaries;

- St Albans City and District Council is not required to carry out a Detailed Review and Assessment for sulphur dioxide.

8.4 SCREENING ASSESSMENT OF SULPHUR DIOXIDE

The Technical Guidance LAQM TG(03) requires assessment of sulphur dioxide to consider the following sources, data or locations:

Table 8.1 Screening Assessment of SO_2

Checklist Item (from Box 7.2 in TG(03))	Updating and Screening Assessment
Monitoring data outside an AQMA	Monitoring of sulphur dioxide is undertaken at the Fleetville automatic monitoring station (section 8.6).
Monitoring data within an AQMA	Monitoring of sulphur dioxide is not currently undertaken within AQMAs in St Albans.
New industrial sources.	There are no new industrial sources in St Albans which have the potential to emit sulphur dioxide. There a no Part A processes in St Albans. Based on the information available, none of the Part B industrial processes in St Albans operate processes which have increased emissions or new relevant exposure.
Industrial sources with substantially increased emissions, or new relevant exposure	
Areas of domestic coal burning	Domestic solid fuel use was assessed in the previous round of review and assessment and shown not to be significant. There is no evidence of any increase the use of solid domestic fuel.
Small Boilers > 5 MW (thermal).	No small boiler processes have been identified for St Albans with output greater than 5MW.
Shipping	N/A St Albans is inland and therefore there are no emissions from coastal shipping in St Albans
Railway Locomotives	According to information supplied by St Albans City and District Council there are no areas where railway engines are run for more than 15 minutes continuously and where members of the public might be exposed.

8.5 BACKGROUND CONCENTRATIONS FOR SULPHUR DIOXIDE

The estimated average background sulphur dioxide concentration in St Albans City and District estimated from UK background concentration maps[7] for 2001 was 3.8 μgm^{-3} in with a maximum concentration of 9.5 μgm^{-3} in 2001. The maximum concentrations were estimated for a location close to the Hatfield Road, Smallford.

8.6 SCREENING ASSESSMENT OF MONITORING DATA

Monitoring for sulphur dioxide was carried out in 2005 at the Fleetville Community Centre Site. Figure 8.1 shows the time series of hourly average concentrations in 2005.

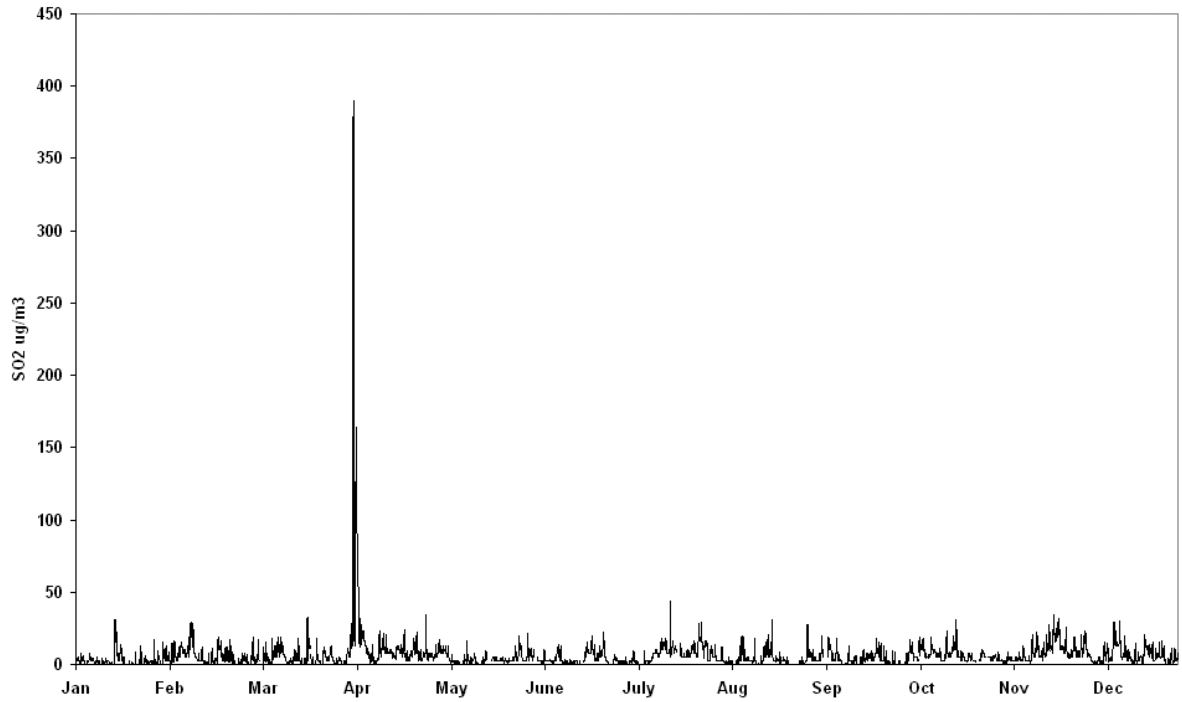


Figure 8.1 Time series of hourly average SO_2 concentrations Fleetville 2005

The average concentration recorded in 2005 was 5.8 μgm^{-3} with a maximum of 390 μgm^{-3}. There were two exceedences of the hourly mean objective of 350 and 13 exceedences of the 15-minute objective value of 267 μgm^{-3} .

8.7 CONCLUSIONS FOR SULPHUR DIOXIDE CONCENTRATIONS IN ST ALBANS CITY AND DISTRICT

There are no significant industrial or domestic sources of sulphur dioxide in St Albans City and District and exceedances of the air quality objectives for sulphur dioxide are unlikely.

A detailed assessment is not required for sulphur dioxide.

9 Updating and Screening Assessment for PM_{10}

9.1 THE NATIONAL PERSPECTIVE

National UK emissions of primary PM_{10} have been estimated as totalling 141,000 tonnes in 2003. Of this total, around 27% was derived from road transport sources. It should be noted that, in general, the emissions estimates for PM_{10} are less accurate than those for the other pollutants with prescribed objectives, especially for sources other than road transport.

The Government established the Airborne Particles Expert Group (APEG) to advise on sources of PM_{10} in the UK and current and future ambient concentrations. Their conclusions were published in January 1999 (APEG, 1999). APEG concluded that a significant proportion of the current annual average PM_{10} is due to the secondary formation of particulate sulphates and nitrates, resulting from the oxidation of sulphur and nitrogen oxides. These are regional scale pollutants and the annual concentrations do not vary greatly over a scale of tens of kilometres. There are also natural or semi-natural sources such as wind-blown dust and sea salt particles. The impact of local urban sources is superimposed on this regional background. Such local sources are generally responsible for winter episodes of hourly mean concentrations of PM_{10} above 100 $\mu g\ m^{-3}$ associated with poor dispersion. However, it is clear that many of the sources of PM_{10} are outside the control of individual local authorities and the estimation of future concentrations of PM_{10} are in part dependent on predictions of the secondary particle component.

9.2 STANDARD AND OBJECTIVE FOR PM_{10}

The Government and the Devolved Administrations have adopted two Air Quality Objectives for fine particles (PM_{10}), which are equivalent to the EU Stage 1 limit values in the first Air Quality Daughter Directive. The objectives are 40 μgm^{-3} as the annual mean, and 50 μgm^{-3} as the fixed 24-hour mean to be exceeded on no more than 35 days per year, to be achieved by the end of 2004. The objectives are based upon measurements carried out using the European gravimetric transfer reference sampler or equivalent. There are also new particle objectives of 20 μgm^{-3} as the annual mean, and 50 μgm^{-3} as the fixed 24-hour mean to be exceeded on no more than 7 days per year, to be achieved by the end of 2010. These objectives are not currently included in the Regulations for the purpose of local air quality management but are likely to be in the future.

9.3 CONCLUSIONS OF THE FIRST ROUNDS OF REVIEW AND ASSESSMENT FOR PM_{10}

The following conclusions were given for PM_{10} in the earlier Updating and Screening Assessment for St Albans City and District Council:

The DMRB screening model and automatic monitoring indicate that:

- The annual mean objective of 40 μgm^{-3} for PM_{10} will be met and that the 24 hour mean objective value of 50 μgm^{-3} will not be exceeded more than 35 times in 2004;
- The annual mean objective of 20 μgm^{-3} for PM_{10} may be exceeded at relevant locations and that the 24 hour mean objective value of 50 μgm^{-3} may be exceeded more than 7 times per year in 2010*.

*These objectives are not included in the Regulations for the purpose of local air quality management.

St Albans City and District Council is not required to carry out a Detailed Review and Assessment for PM_{10} .

9.4 SCREENING ASSESSMENT OF PM_{10}

The Technical Guidance LAQM TG(03) requires assessment of PM_{10} to consider the following sources, data or locations:

Table 9.1 Screening Assessment of PM_{10}

Checklist Item (from Box 6.2 in TG(03) update)	**Updating and Screening Assessment**
Monitoring data outside an AQMA	Monitoring of PM_{10} is undertaken at the Fleetville automatic monitoring site.
Monitoring data within an AQMA	Monitoring of PM_{10} is not undertaken within AQMAs in St Albans
Junctions.	Annual average PM_{10} concentrations and exceedances of the daily mean at receptors near busy road junctions in St Albans City and District were estimated in the previous Updating and Screening Assessment for 2004 and 2010. The estimated concentrations were generally below the objective values (although there were some possible exceedances of the 2010 annual mean) and there has been no significant increase in traffic flows recorded at any of the junctions.
Roads with high flow of buses and/or HGVs.	There are no roads identified in St Albans with high (>20%) flows of buses or HGVs
New roads constructed or proposed since last round of R&A	No new roads have been constructed or proposed since the previous round or review and assessment.
Roads with significantly changed traffic flows, or new relevant exposure.	There have been no significant changes in traffic flows or exposure on A roads and motorways in St Albans City and District since the last Updating and Screening Assessment.
Roads close to the objective during the second round of Review and Assessment	There were no roads estimated to have PM_{10} concentrations close to the 2004 objectives during the last Review and Assessment. The maximum concentration calculated using the DMRB model was 30.3 ugm^{-3} for a section of the M1.
New industrial sources.	There are no new industrial sources in St Albans which have the potential to emit significant amounts of PM_{10} . There are no Part A processes in St Albans. Based on the information available, none of the Part B industrial processes in St Albans operate processes which have increased emissions or new relevant exposure
Industrial sources with substantially increased emissions, or new relevant exposure	
Areas of domestic solid fuel burning	Domestic solid fuel use was assessed in the previous round of review and assessment and shown not to be significant. There is no evidence of any increase the use of solid domestic fuel.
Quarries / landfill sites / opencast coal / handling of dusty cargoes at ports etc.	There have been no new landfill or quarrying processes in the District since the last round of review and assessment.
Aircraft	There are no major airports in the district. The nearest major airport is Luton airport which is about 4 km northwest of the district

9.5 BACKGROUND CONCENTRATIONS FOR PM_{10}

The estimated average background PM_{10} concentration for St Albans City and District in 2005 from UK Background maps[7] was 22.0 μgm^{-3} with a maximum concentration of 25.7 μgm^{-3}. The estimated average background PM_{10} concentration in 2010 was 20.2 μgm^{-3} with a maximum concentration of 23.2 μgm^{-3} at a Chilswell Green close to the M1 and M25.

9.6 SCREENING ASSESSMENT OF MONITORING DATA

Monitoring for PM_{10} is been undertaken in St Albans City and District at the Fleetville Centre Site using a TEOM automatic monitor. The time series of hourly average concentrations is shown in Figure 9.1.

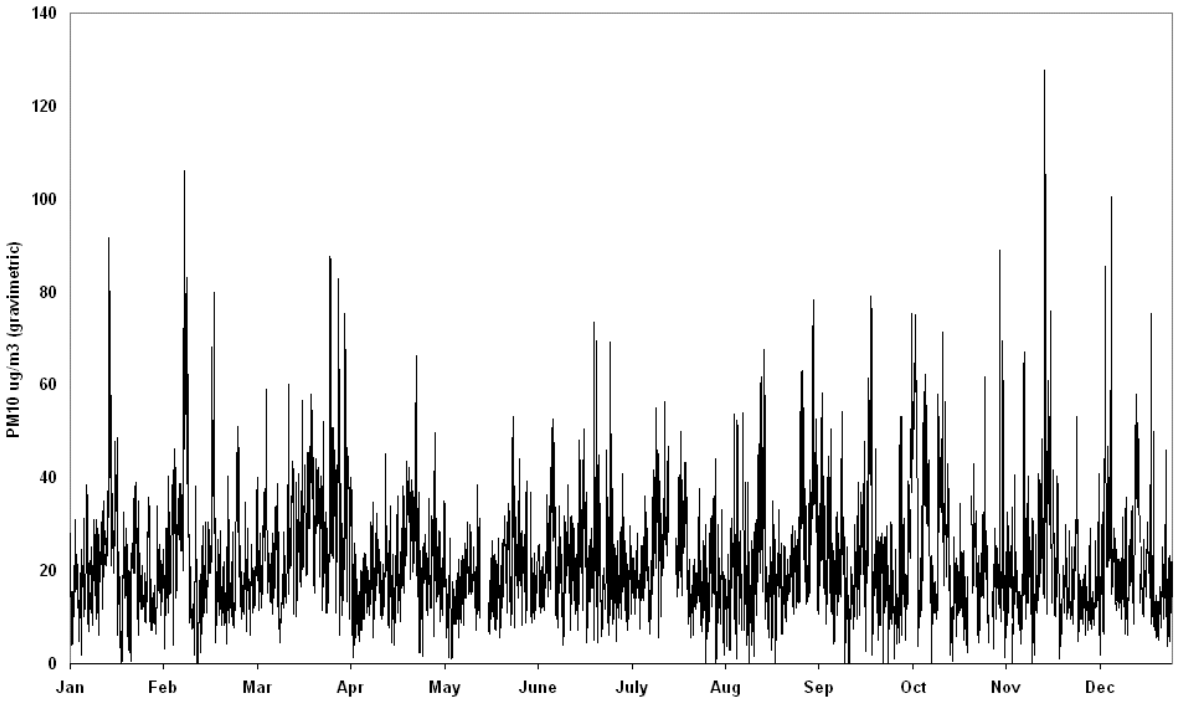


Figure 9.1 Time series of hourly average PM_{10} concentrations Fleetville 2005

The annual average concentration recorded for 2005 was 22.0 μgm^{-3} (gravimetric). There were three days when the daily average objective value of 50 μgm^{-3} was exceeded. The estimated annual mean concentration for 2010 using the procedures in Box 8.5 of LAQM TG(0 3) is 20.6 μgm^{-3}.

9.7 SCREENING ASSESSMENT OF ROAD TRAFFIC SOURCES

Traffic flow data and count data supplied by Hertfordshire County Council (Appendix 2) show that there have been no significant increase in traffic flows since the last Updating and Screening Assessment. An initial screening assessment was undertaken using DMRB for A roads and motorways in St Albans using data taken from the NAEI. Traffic speeds and receptor distance were selected to provide "worst case" estimates. Table 9.2 shows that annual mean concentrations in excess of 40 μgm^{-3} were predicted at receptors close the M1, M10 and M25 motorways.

Table 9.2 Annual Average PM_{10} Concentrations in St Albans City and District

Road name	Distance from link centre to receptor (m)	AADT *(combined, veh/day)	Annual average speed (km/h)	Total % HDV	PM_{10} (μgm^{-3}) 2004	Days >50 (μgm^{-3}) 2004	PM_{10} (μgm^{-3}) 2010	Days >50 (μgm^{-3}) 2010
M10	15	27557	95	10.3	28.1	21	**24.0**	**10**
A5183	5	22427	80	3.4	26.3	16	**22.7**	7
A5183	5	12973	51	4.6	25.9	15	**22.6**	7
A1081	5	17423	80	3.5	24.0	10	**20.9**	5
A1057	5	18310	51	6.3	24.6	11	**21.0**	5
A5183	5	17575	80	3.2	24.0	10	**20.9**	5
A1081	5	15481	51	8.1	27.4	19	**23.5**	**9**
A414	10	43559	80	8.1	25.8	14	**21.8**	6
A4147	5	30358	51	2.8	26.0	15	**22.4**	7
M1	15	188349	113	13.2	37.7	**64**	**29.7**	**26**
A5	10	26277	113	10.6	29.7	26	**24.7**	**12**
A5183	5	18867	80	3.4	25.7	14	**22.3**	7
A1081	5	22795	51	2.9	25.3	13	**22.0**	6
A1081	5	26072	51	10.6	26.5	16	**22.0**	6
A405	5	27500	80	8.4	28.1	21	**23.8**	**10**
M25	15	108184	113	16.0	36.3	**56**	**28.8**	**23**
M1	15	147327	113	14.0	35.9	**54**	**28.3**	**22**
A1081	5	20455	51	3.1	26.2	16	**22.8**	**8**
A4147	5	11245	51	2.5	24.6	11	**21.7**	6
M25	15	132202	113	16.3	37.7	**65**	**29.8**	**27**
M1	15	160792	113	13.7	37.5	**64**	**29.6**	**26**
A1081	5	16765	51	3.0	26.0	15	**22.6**	7
A414	10	55781	80	7.5	28.9	24	**24.3**	**11**
A5183	5	8729	51	2.6	24.2	11	**21.5**	5
M1	15	158326	113	14.2	36.6	**58**	**28.9**	**24**
A5183	5	27512	80	2.4	24.5	11	**21.3**	5
A1081	5	18523	80	2.6	24.7	12	**21.4**	5
A4147	5	11475	80	3.7	26.5	16	**23.1**	**8**
M1	15	51913	113	8.0	30.6	**38**	**25.7**	**14**
A5	10	26279	113	10.6	29.7	26	**24.7**	**12**
A1081	5	17002	51	3.4	24.8	12	**21.6**	6
A1081	5	20777	51	2.9	25.1	13	**21.7**	6
A5183	5	13412	80	7.7	26.3	16	**22.8**	**8**
A405	5	27960	80	8.7	28.2	21	**23.9**	**10**
A1057	5	11077	51	5.6	25.5	14	**22.4**	7
A1081	5	10994	51	3.4	25.1	13	**22.2**	7
A5183	5	19423	51	3.9	26.8	17	**23.1**	**8**

The DMRB screening tool indicates that the annual mean concentration objective for 2004 was achieved but that the daily mean objective may have been exceeded at locations near the M1 and M25. These locations have been remodelled for 2004 using receptor distances obtained from OS Landline GIS maps (Table 9.3). The DMRB model indicates that the 2004 objective would not have been exceeded at the nearest receptors to the road areas studied.

The projected 2010 annual mean concentration and daily concentrations greater than 50 μgm^{-3} objectives are likely to be widely exceeded.

Table 9.3 Annual average PM10 concentrations estimated using NAEI data

Road name	East	North	Distance from link centre to receptor (m)	AADT 2004(combined, veh/day)	Annual average speed (km/h)	Total % HDV	PM_{10} (μgm^{-3}) 2004	Days >50 (μgm^{-3})
M1	509757	207000	215	171633	113	13.2	24.7	11.8
M25	512500	203110	273	98583	113	16.0	25.8	14.4
M1	509100	215300	700	134252	113	14.0	22.6	7.4
M25	516216	202781	38	120469	113	16.3	30.9	30.8
M1	511254	204604	450	146522	113	13.7	24.0	10.0
M1	509700	210500	36	144275	113	8.0	28.6	22.5

9.7.1 Busy Junctions

The following roads and junctions were identified as areas of high traffic volumes with potential for public exposure. These roads been examined using DMRB with traffic data from Hertfordshire County Council or the NAEI. Tables 9.4 and 9.5 show PM_{10} concentrations at the nearest receptors to the junctions. Receptor distance were measured using the OS Landline maps for the District

Table 9.4 Annual average PM_{10} concentrations at road junctions in St Albans City and District 2004

Location	Junction	East	North	AADT 2004	%HDV	PM_{10} (μgm^{-4}	Days >50
St Albans	A5183 Holywell Hill A1081 London Road	514900	206940	18708 25335	3.7 4.0	30.2	28.4
St Albans	A 5183 Watling Street A414 North Orbital Road	514200	205200	15835 42362	4.0 4.0	23.5	9.0
St Albans	A4147 Bluehouse Hill C98 King Harry Lane	513150	206720	23454 17130	4.0 4.0	24.6	11.5
St Albans	C62 Batchwood Drive A1081 Harpenden Road	514300	208500	16587 16423	4.0 4.0	28.0	20.7
Redbourn	M1 Junction 9 A5183 Redbourn Road	509500	214500	134580 14329	15.8 4.0	22.6	7.3
Hemel Hempstead	M1 Junction 8 A414 Breakspear Way	508600	207500	134580 47887	15.8 4.0	26.0	14.9

Table 9.5 Annual average PM_{10} concentrations at road junctions in St Albans City and District 2010

Location	Junction	East	North	AADT 2010	%HDV	PM_{10}	Days >50
St Albans	A5183 Holywell Hill A1081 London Road	514900	206940	20418 27651	3.7 4.0	**26.4**	**15.9**
St Albans	A 5183 Watling Street A414 North Orbital Road	514200	205200	17283 46234	4.0 4.0	**22.5**	**7.2**
St Albans	A4147 Bluehouse Hill C98 King Harry Lane	513150	206720	25598 18696	4.0 4.0	**25.5**	**13.5**
St Albans	C62 Batchwood Drive A1081 Harpenden Road	514300	208500	18103 17924	4.0 4.0	**24.5**	**11.3**
Redbourn	M1 Junction 9 A5183 Redbourn Road	509500	214500	146881 15639	15.8 4.0	**21.4**	5.3
Hemel Hempstead	M1 Junction 8 A414 Breakspear Way	508600	207500	146881 52264	15.8 4.0	**24.7**	1.8

The DMRB screening tool indicates that the annual and daily mean concentration objectives for 2004 was achieved. The projected 2010 annual mean concentration and daily exceedances are likely to be widely exceeded.

9.8 CONCLUSIONS FOR PM_{10} CONCENTRATIONS IN ST ALBANS CITY AND DISTRICT

The DMRB screening tool indicates that the annual mean concentration and the daily mean objectives will have been achieved. The projected 2010 annual mean concentration and daily exceedances are likely to be widely exceeded.

10 Conclusions

10.1 CARBON MONOXIDE

There are no roads in St Albans City and District which can be classified as 'very busy' according to the criteria in the guidance. There are no industrial processes which are significant sources of carbon monoxide. Exceedances of the air quality objective for carbon monoxide are therefore unlikely.

A detailed assessment is not required for carbon monoxide in St Albans City and District.

10.2 BENZENE

There are no roads in St Albans City and District, which can be classified as 'very busy' according to the criteria in the guidance. There are no petrol stations with a throughput greater than 2 million litres and with relevant exposure within 10m of the pumps.

A detailed assessment is not required for benzene in St Albans City and District.

10.3 1,3-BUTADIENE

Estimated background concentrations and data from national monitoring stations indicate that the objective for 1,3-butadiene is likely to be achieved by the end of 2003. There are no industrial processes, current or proposed, in St Albans City and District, which have the potential to emit 1,3-butadiene.

A detailed assessment is not required for 1,3-butadiene in St Albans City and District.

10.4 LEAD

Emissions of lead from industrial processes in St Albans City and District are likely to be very small and it is unlikely they will cause exceedances of the air quality objectives for lead in 2004 and 2008.

A detailed assessment is not required for lead in St Albans City and District.

10.5 NITROGEN DIOXIDE

No roads or busy junctions were identified using DMRB where the objectives were likely to be exceeded.

NO_2 concentrations in 2005 measured using diffusion tubes were above the objective annual mean limit value of 40 μgm^{-3} at six sites:

SA 07 Waterdale Bricket Wood (M1)
SA 15 Peahen PH Holywell Hill St Albans
SA 22 Lybury Lane Redbourn (M1)
SA 30 Smug Oak Lane Bricket Wood (M25)
SA 31 Radlett Road (M25)
SA 33 Mount Drive Park Street

The conclusions for these areas are as follows:

- Diffusion tubes SA 15, SA 30 and SA 31 are within existing AQMAs.

- The area of Lybury Lane Redbourn (SA 22) was considered in the 2004 Detailed Assessment and it was concluded that there were no relevant receptors in the areas of exceedence and that no further action was necessary.

- The Bricket Wood Area (SA 07) is within a revoked AQMA. The area was remodelled for the Stage 4 Assessment. This assessment concluded that no exceedances were likely at relevant locations in Bricket Wood.

- Mount Drive/Park Street (SA 33); This is a kerbside site and the nearest receptor is 36m away. Using the factor of 0.75 to as given in the Air Quality Review and Assessment website the concentration at the nearest building facade is estimated to be 31.5 μgm^{-3} .

A detailed assessment is not required for nitrogen dioxide in St Albans City and District.

10.6 SULPHUR DIOXIDE

There are no significant industrial or domestic sources of sulphur dioxide in St Albans City and District.

A detailed assessment is not required for sulphur dioxide in St Albans City and District.

10.7 PM_{10}

The DMRB screening tool indicates that the annual mean concentration and the daily mean objectives for 2004 will have been achieved. The projected 2010 annual mean concentration and daily mean objectives are likely to be widely exceeded in that year .

A detailed assessment is not required for PM_{10} in St Albans City and District.

10.8 SUMMARY AND RECOMMENDATIONS

This updating and screening assessment for St Albans City and District Council has concluded that all the objectives in the Air Quality Regulations for England will be met by the relevant dates. However, the EU annual average limit value (Stage 2) for PM_{10} may be exceeded at some locations within the District, close to busy roads and junctions in 2010.

11 The UK Air Quality Strategy

The Government prepared the Air Quality Strategy for England, Scotland, Wales and Northern Ireland for consultation in August 1999. It was published in January 2000 (DETR, 2000)[3].

11.1.1 National Air Quality Standards

At the centre of the Air Quality Strategy is the use of national air quality standards to enable air quality to be measured and assessed. These also provide the means by which objectives and timescales for the achievement of objectives can be set. These standards and associated specific objectives to be achieved between 2003 and 2008 are shown in Table 13.1. The table shows the standards in ppb and μgm^{-3} with the number of exceedances that are permitted (where applicable) and the equivalent percentile.

Table 13.1 Objectives included in the Air Quality Regulations 2000 and (Amendment) Regulations 2002 for the purpose of Local Air Quality Management

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene All authorities	16.25 μg/m^3	running annual mean	31.12.2003
Authorities in England and Wales only	5.00 μg/m^3	annual mean	31.12.2010
Authorities in Scotland and Northern Ireland only[a]	3.25 μg/m^3	running annual mean	31.12.2010
1,3-Butadiene	2.25 μg/m^3	running annual mean	31.12.2003
Carbon monoxide Authorities in England, Wales and Northern Ireland only[a]	10.0 mg/m^3	maximum daily running 8-hour mean	31.12.2003
Authorities in Scotland only	10.0 mg/m^3	running 8-hour mean	31.12.2003
Lead	0.5 μg/m^3 0.25 μg/m^3	annual mean annual mean	31.12.2004 31.12.2008
Nitrogen dioxide[b]	200 μg/m^3 not to be exceeded more than 18 times a year 40 μg/m^3	1 hour mean annual mean	31.12.2005 31.12.2005
Particles (PM_{10}) (gravimetric)[c] All authorities	50 μg/m^3 not to be exceeded more than 35 times a year 40 μg/m^3	24 hour mean annual mean	31.12.2004 31.12.2004
Authorities in Scotland only[d]	50 μg/m^3 not to be exceeded more than 7 times a year 18 μg/m^3	24 hour mean annual mean	31.12.2010 31.12.2010
Sulphur dioxide	350 μg/m^3 not to be exceeded more than 24 times a year 125 μg/m^3 not to be exceeded more than 3 times a year 266 μg/m^3 not to be exceeded more than 35 times a year	1 hour mean 24 hour mean 15 minute mean	31.12.2004 31.12.2004 31.12.2005

a. Air Quality (Northern Ireland) Regulations 2003.
b. The objectives for nitrogen dioxide are provisional.
c. Measured using the European gravimetric transfer sampler or equivalent.
d. These 2010 Air Quality Objectives for PM_{10} apply in Scotland only, as set out in the Air Quality (Scotland) Amendment Regulations 2002.

11.1.2 Timescales to achieve the objectives for the pollutants in Air Quality Strategy
In most local authorities in the UK, objectives will be met for most of the pollutants within the timescale of the objectives shown in Table 13.1. It is important to note that the objectives for NO_2 remain provisional. The Government has recognised the problems associated with achieving the standard for ozone and this will not therefore be a statutory requirement. Ozone is a secondary pollutant and transboundary in nature and it is recognised that local authorities themselves can exert little influence on concentrations when they are the result of regional primary emission patterns.

11.2 AIR QUALITY REVIEWS – THE APPROACHES AND EXPECTED OUTCOMES

Technical Guidance has been issued in 'Review and Assessment: Technical Guidance' LAQM.TG (03)[3] to enable air quality to be monitored, modelled, reviewed and assessed in an appropriate and consistent fashion. This updating and screening assessment has considered the procedures set out in this technical guidance.
The primary objective of undertaking a review of air quality is to identify any areas that are unlikely to meet national air quality objectives and ensure that air quality is considered in local authority decision making processes. The complexity and detail required in a review depends on the risk of failing to achieve air quality objectives and it has been proposed therefore that reviews should be carried out in two steps. Both steps of review and assessment may be necessary and every authority is expected to undertake at least a first stage review and assessment of air quality in their authority area. The steps are briefly described in the following table, Table 13.2.

Table 13.2 Brief details of steps in the second Round of the Air Quality Review and Assessment process

Level of Assessment	Objective	Approach
Updating and Screening	To identify those matters that have changed since the last review and assessment, which might lead to a risk of an air quality objective being exceeded	Use a checklist to identify significant changes that require further consideration. Where such changes are identified, than apply simple screening tools to decide whether there is sufficient risk of an exceedance of an objective to justify a Detailed Assessment
Detailed assessment	To provide an accurate assessment of the likelihood of an air quality objective being exceeded at locations with relevant exposure. This should be sufficiently detailed to allow the designation or amendment of any necessary AQMAs	Use quality-assured monitoring and validated modelling methods to determine current and future pollutant concentrations in areas where there is a significant risk of exceeding an air quality objective.
Annual Progress reports	Local authorities should prepare annual air quality Progress Reports between subsequent rounds of reviews and assessments. The concept is that this will ensure continuity in the LAQM process.	The precise format for the Progress Report has not yet been determined, but will essentially follow the checklist approach that is set out in subsequent chapters of this document. Further details on the Progress Reports will be provided via the Helpdesks by the middle of 2003. It is envisaged that these Progress Reports could be useful for the compilation of annual 'state of the environment' reports that many authorities already prepare.

The current deadline for completion of updating and screening assessments is May 2003, and for detailed assessments April 2004.

11.3 LOCATIONS THAT THE REVIEW AND ASSESSMENT MUST CONCENTRATE ON

For the purpose of review and assessment, the authority should focus their work on locations where members of the public are likely to be exposed over the averaging period of the objective. Table 13.3 summarises the locations where the objectives should and should not apply.

Table 13.3 Typical locations where the objectives should and should not apply

Averaging Period	Pollutants	Objectives *should* apply at …	Objectives should *not* generally apply at …
Annual mean	1,3 Butadiene Benzene Lead Nitrogen dioxide Particulate Matter (PM_{10})	All background locations where members of the public might be regularly exposed.	Building facades of offices or other places of work where members of the public do not have regular access.
		Building facades of residential properties, schools, hospitals, libraries etc.	Gardens of residential properties.
			Kerbside sites (as opposed to locations at the building facade), or any other location where public exposure is expected to be short term
24 hour mean and 8-hour mean	Carbon monoxide Particulate Matter (PM_{10}) Sulphur dioxide	All locations where the annual mean objective would apply.	Kerbside sites (as opposed to locations at the building facade), or any other location where public exposure is expected to be short term.
		Gardens of residential properties.	

Table 13.3 (contd.) Typical locations where the objectives should and should not apply

Averaging Period	Pollutants	Objectives should apply at …	Objectives should generally not apply at …
1 hour mean	Nitrogen dioxide Sulphur dioxide	All locations where the annual mean and 24 and 8-hour mean objectives apply.	Kerbside sites where the public would not be expected to have regular access.
		Kerbside sites (e.g. pavements of busy shopping streets).	
		Those parts of car parks and railway stations etc. which are not fully enclosed.	
		Any outdoor locations to which the public might reasonably expected to have access.	
15 minute mean	Sulphur dioxide	All locations where members of the public might reasonably be exposed for a period of 15 minutes or longer.	

It is unnecessary to consider exceedances of the objectives at any location where public exposure over the relevant averaging period would be unrealistic. Locations should also represent non-occupational exposure.

12 References

1. Part IV of the Environment Act 1995. Local Air Quality Management. LAQM.TG(03) January 2003.
2. The Air Quality (England) Amendment Regulations 2002, ISBN 0 11 044220 2.
3. DETR (2000b) The Air Quality Strategy for England, Scotland, Wales and Northern Ireland. Department of the Environment, Transport and the Regions. Cm 4548, SE 2000/3, NIA 7.
4. St Albans City and District Council (1999) First Stage Air Quality Review & Assessment., St Albans City and District Council, January 1999.
5. St Albans City and District Council (1999) Second Stage Air Quality Review & Assessment. St Albans City and District Council, July 1999
6. St Albans City and District Council, Stage 4 Assessment January 2003
7. St Albans City and District Council, Updating and Screening Assessment July 2003
8. St Albans City and District Council, Detailed Assessment March 2004
9. Maps of Estimated Ambient Air Pollution in 2001 and Projections for Other Years. http://www.airquality.co.uk/archive/laqm/tools.php

8. Design Manual For Roads and Bridges Highways Agency 2003

Appendices

CONTENTS

Appendix 1

Monitoring Data

CONTENTS

Table A1.1 Diffusion Tube Monitoring Site Details in St Albans

Type	East	North	Code	Address
R	515100	207700	SA01	Museum of St Albans, Hatfield Road
B	514100	206500	SA02	Holywell Hill, St Albans
B	514900	207400	SA03	St Peters Street, St Albans
B	516700	209200	SA04	Pondfield Crescent Marshalswick St Albans
B	510100	211800	SA05	Ben Austins, Redbourn
B	518600	203500	SA06	Ridgeview Hostel, Barnet Road, London Colney
B	512000	202200	SA07	Waterdale, Bricket Wood
B	517400	203900	SA08	Bowmans Green JMI, Telford Rd, London Colney
R	513500	214300	SA09	High Street, Harpenden
B	514400	214300	SA10	Crabtree Lane, Harpenden
B	512800	210200	SA11	Redbourn JMI, Crouch Hall Lane, Redbourn
B	512800	202200	SA12	Ashridge Drive, Bricket Wood
R	517700	214100	SA13	Wheathampstead High Street
B	517500	213900	SA14	Adult Ed. Centre, Butterfield, Wheathampstead
R	514700	207100	SA15	Peahen PH, Holywell Hill, St Albans
B	513600	204400	SA16	Tippendell Lane, St Albans
B	517700	204700	SA17	London Colney Roundabout
B	513900	208100	SA18	Batchwood Drive, St Albans
B	516541	207359	SA20	Fleetville C. Centre 1, Royal Rd, St Albans (SA1)
B	513317	202665	SA21	Lye Lane, Bricket Wood
-	509434	212800	SA22	Lybury Lane
-	509024	212779	SA23	St Agnells
-	509117	214082	SA24	Redding Lane
-	511353	203756	SA25	Searches Farm
-	512569	202728	SA26	Oakwood Road
-	512690	202713	SA27	Five Acres Avenue, Bricket Wood
-	513022	202624	SA29	Meadow Close, Bricket Wood
-	515390	202564	SA30	Smug Oak Lane
-	515297	202774	SA31	Radlett Road
-	514900	203852	SA32	Sycamore Drive, Park Street
-	514650	204549	SA33	Mount Drive, Park Street
B	516541	207359	SA34	Fleetville C. Centre 2, Royal Rd, St Albans (SA1)
B	516541	209359	SA35	Fleetville C. Centre 3, Royal Rd, St Albans (SA1)
	520092	206676	SA37	Sleapcross Gardens

Table 1.2 Measured (uncorrected) monthly average NO_2 concentrations (μgm^{-3}) at sites in St Albans City and District in 2005

Type	Code	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Mean
R	SA01	42.0	45.8	45.8	34.4	28.7	21.0	36.3	32.5	22.9	42.0	40.1	45.8	36.4
B	SA02	28.7	30.6	30.6	30.6	15.3	19.1	17.2		22.9	32.5	24.8	34.4	26.0
B	SA03	32.5	38.2	38.2	32.5	21.0	24.8	24.8	24.8	15.3	34.4	42.0	38.2	30.6
B	SA04	26.7	30.6	30.6	22.9	15.3	15.3	15.3	15.3	15.3	28.7	24.8	34.4	22.9
B	SA05	24.8	28.7	26.7	24.8	17.2	21.0	19.1	22.9	22.9	28.7	30.6	30.6	24.8
B	SA06	34.4	36.3	42.0	40.1	26.7	34.4	26.7	26.7	22.9	40.1	36.3	38.2	33.7
B	SA07	47.8	51.6	49.7	43.9	38.2	36.3	34.4	36.3	30.6	43.9	55.4	51.6	43.3
B	SA08	36.3	38.2	40.1	32.5	21.0	28.7	22.9	22.9	21.0	42.0	32.5	40.1	31.5
R	SA09	40.1	51.6	49.7	43.9	26.7	38.2	32.5	30.6	30.6	38.2	42.0	45.8	39.2
B	SA10	30.6	40.1	34.4	22.9	15.3	17.2	17.2	21.0	13.4	30.6	30.6	36.3	25.8
B	SA11	30.6	32.5	38.2	24.8	17.2	21.0	19.1	21.0	17.2	24.8	32.5	34.4	26.1
B	SA12	30.6	40.1	36.3	32.5	22.9	26.7	22.9	24.8	19.1	26.7	36.3	36.3	29.6
R	SA13	30.6	32.5	36.3	32.5	22.9	24.8	22.9	22.9	22.9		30.6	32.5	28.3
B	SA14	26.7	30.6	34.4	24.8	15.3	15.3	15.3	17.2	7.6	28.7	24.8	32.5	22.8
R	SA15	47.8	57.3	61.1	59.2	45.8	59.2	49.7	42.0	34.4	57.3	57.3	63.0	52.8
B	SA16	36.3	40.1	43.9	38.2	19.1	28.7	24.8	22.9	11.5	32.5	40.1	42.0	31.7
B	SA17	36.3	42.0	38.2	36.3	17.2	28.7		32.5	30.6	34.4	34.4	42.0	33.9
B	SA18	28.7	32.5	32.5	26.7	17.2	17.2	19.1	21.0	21.0	30.6	28.7	32.5	25.6
B	SA20	26.7	34.4	32.5	28.7	21.0	21.0	19.1	19.1	17.2	30.6	32.5	36.3	26.6
B	SA21	40.1	49.7	51.6	40.1	32.5	40.1			28.7	34.4	38.2	40.1	39.5
-	SA22	45.8	57.3	53.5	51.6	42.0	43.9	45.8	26.7	36.3	57.3	28.7	42.0	44.2
-	SA23	30.6	38.2	30.6	26.7	19.1	22.9	21.0	17.2	26.7	45.8	26.7		27.8
-	SA24		38.2	9.6	34.4	21.0	24.8	24.8	17.2	28.7	36.3	28.7	38.2	27.4
-	SA25	40.1	53.5	43.9	42.0	30.6	42.0	36.3	22.9	28.7	42.0	32.5	40.1	37.9
-	SA26	40.1	43.9	42.0	40.1		34.4	30.6		30.6	36.3	28.7	40.1	36.7
-	SA27	32.5	43.9	40.1	32.5	21.0	24.8	24.8	26.7	30.6	32.5	38.2	38.2	32.2
-	SA29		49.7	43.9	34.4	22.9	28.7	24.8	26.7	28.7		34.4	40.1	33.4
-	SA30	47.8	55.4	57.3	47.8	38.2	49.7	43.9	36.3	40.1	34.4	43.9	47.8	45.2
-	SA31	51.6	43.9	57.3	49.7	36.3	40.1	38.2	36.3	43.9	49.7	45.8	51.6	45.4
-	SA32	34.4	42.0	43.9	30.6	28.7	28.7		49.7	26.7	36.3	36.3	40.1	36.1
-	SA33	42.0	51.6	57.3	51.6	34.4	45.8	32.5	40.1	24.8	43.9	45.8	49.7	43.3
B	SA34	28.7	34.4	34.4	30.6	19.1	21.0	19.1	19.1	21.0	30.6	34.4	36.3	27.4
B	SA35	28.7	32.5	34.4	26.7	17.2	19.1	19.1	19.1	21.0	30.6	32.5	38.2	26.6
	SA37	36.3	42.0	43.9	38.2	28.7	32.5	30.6	26.7	32.5	45.8	34.4	42.0	36.1

Table 1.3 Measured monthly average benzene concentrations (μgm^{-3}) at sites in St Albans City and District in 2004-2005

	August	September	October	November	December	January	Mean
Harpenden High St	0.8	1.4	0.8	0	1.6	1.7	1.1
London Colney	0.6	0.9	0.7	0	1.1	1	0.7
Fleetville	0.9	-	0.6	0	1.3	1	0.8
Peahen	1.6	1.4	1.5	0	2	2.3	1.5
Eaton Lodge	0.8	0.9	0.7	0	1.1	1.1	0.8
Cherry Tree Lodge	1.2	1.1	0.4	0	1.1	1.2	0.8

Appendix 2

Traffic Flow Data

CONTENTS

Table A2.1 Road classifications in LAQM TG(03)[1]

Very busy roads	Single carriageway roads with daily average traffic flows which exceed 80,000 vehicles per day. Dual carriageway (2 or 3-lane) roads with daily average traffic flows which exceed 120,000 vehicles per day. Motorways with daily average traffic flows which exceed 140,000 vehicles per day.
Busy Roads	Roads with more than 30,000 vehicles per day.

Explanation of the data fields in table A2.2	
Rd_no	Number of the road
x	Grid reference Easting
y	Grid reference Northing
All_vehicles	AADF Total
CAR	AADF Cars
BUS	AADF Buses
LGV	AADF Light Goods Vehicles
HGV	AADF HGVs
Moto	AADF Motorcycles
PB	Built-up primary road
AADF	Annual Average Daily Flow

A 2.2 Traffic Flow Data from the NAEI Data Warehouse 2004

Rd_no	X	Y	All	CAR	BUS	LGV	HGVr	HGVa	Moto
M10	514220	205140	25111	20417	73	1964	1371	1151	135
A5183	510050	213700	20437	17379	129	2247	512	59	111
A5183	514270	205600	11822	9820	102	1318	400	36	146
A1081	514330	211200	15877	13650	141	1527	405	15	139
A1057	520000	207891	16685	13682	195	1713	717	135	243
A5183	511849	210111	16015	13864	161	1500	317	40	133
A1081	514870	207416	14107	11210	731	1597	379	28	162
A414	520332	206751	39693	31935	181	4276	1701	1344	256
A4147	513280	207000	27664	24758	228	1900	515	38	225
M1	509757	207000	171633	129690	876	18326	8107	13680	954
A5	508606	215000	23945	17657	130	3505	1085	1328	240
A5183	513919	207756	17193	15005	160	1445	401	19	163
A1081	513610	213640	20772	18510	64	1512	517	29	140
A1081	518500	204000	23758	18475	118	2541	1353	1054	217
A405	513610	203980	25059	20245	145	2395	1282	679	313
M25	512500	203110	98583	71528	140	10957	5691	9909	358
M1	509100	215300	134252	101090	837	13752	5977	11927	669
A1081	515000	207700	18640	15685	272	2166	291	23	203
A4147	514100	207700	10247	8876	84	1025	157	12	93
M25	516216	202781	120469	86115	453	14416	6750	12387	348
M1	511254	204604	146522	109273	803	16361	6736	12529	820
A1081	516000	206150	15277	13136	144	1497	291	26	183
A414	515000	204864	50831	41034	193	5517	1946	1651	490
A5183	514318	207546	7954	6839	39	808	156	8	104
M1	509700	210500	144275	105654	991	17281	6734	12760	855
A5183	511030	211994	25070	21500	106	2707	464	38	255
A1081	510000	216980	16879	14841	117	1491	297	33	100
A4147	510000	206019	10457	9046	133	844	234	25	175
M1	509175	207600	47306	37798	139	5313	2121	1535	400
A5	509255	214650	23947	17658	130	3506	1085	1328	240
A1081	513770	212500	15493	13413	118	1444	386	25	107
A1081	512940	215000	18933	16466	140	1823	358	44	102
A5183	514660	204500	12222	9727	96	1502	686	153	58
A405	514000	204660	25479	20346	69	2594	1363	779	328
A1057	516000	207260	10094	8479	359	913	190	20	133
A1081	515000	208470	10018	8609	102	1033	226	12	36
A5183	514665	207000	17699	15414	279	1420	375	38	173

Table A2.3 Traffic Flow Data for local roads in St Albans City and District 2005 supplied by Hertfordshire County Council

Road	Location of link	road type	speed type	2005 Annual Average Weekday Flow
M1	Junction 6a-7, Bedmond	Motorway	Rural	141137
M1	Junction 8-9, Hemel Hempstead	Motorway	Rural	137272
M10	Junction 1-2, Park Street	Motorway	Rural	25218
A5183	Watling Street, St Albans	Other A Road	Rural	11284
A5183	Watling Street, St Albans	Other A Road	Urban	16152
A5183	Holywell Hill, St Albans	Other A Road	Urban	19082
A5183	Redbourn Road, Redbourn	Other A Road	Rural	14616
A5	Watling St, Markyate	Trunk Road	Rural	21516
A1081	Bypass, London Colney	Other A Road	Rural	23514
A1081	Harpenden Road, Harpenden	Other A Road	Rural	16751
A1081	Luton Road, Harpenden	Other A Road	Rural	18012
A405	North Orbital Road, The Noke, St Albans	Primary A Road	Rural	43719
A414	North Orbital Road, Park Street	Primary A Road	Rural	43209
A414	North Orbital Road, Hatfield	Primary A Road	Rural	41702
A1081	London Road, St Albans	Other A Road	Urban	25842
B4630	Watford Road, St Albans	B road	Urban	21196
A414	Breakspear Way, Hemel H	Primary A Road	Rural	48845
A1057	Hatfield Road, Smallford, St Albans	Other A Road	Urban	14939
B487	Redbourn Lane, Harpenden	B road	Rural	16342
B487	Hemel H. Road, Redbourn	B road	Rural	16188
B556	Harper Ln, London Colney	B road	Rural	10941
B5378	Shenley Lane, London Colney	B road	Urban	9609
B653	Lower Luton Road, Batford	B road	Rural	12619
C94	Wheathampstead Rd, Wheathampstead	C Road	Rural	9011
C62	Marshalswick Lane, St Albans	C Road	Urban	15248
C62	Batchwood Drive, St Albans	C Road	Urban	16919
C98	King Harry Lane, St Albans	C Road	Urban	17473
A4147	Bluehouse Hille, St Albans	Other A Road	Rural	23923

Appendix 3

Emissions Data

CONTENTS

Table A3.1 Part A and B Processes in St Albans (excluding petrol stations)

Part A/Part B Ref	Company	Comment
Part A	-	No Part A processes
Part B		
1/92	St Albans City Hospital,	Clinical Waste Incinerator
3/93	Lafarge Redlands Aggregates Ltd	Roadstone Coating Process
4/93	Lafarge Aggregates Ltd	Blending & Use of Bulk Cement
5/93	C D Bramall Ltd	Respraying of Road Vehicles
6/93	RMC Readymix,	Blending & Use of Bulk Cement
7/93	Lafarge Redlands Readymix Ltd,	Blending & Use of Bulk Cement
9/93	Welgan Motor Bodies,	Respraying of Road Vehicles
11/93	Brian Robson Coachworks,	Respraying of Road Vehicles
14/96	Home Pac Ltd,	Timber Process
15/96	T W Russell Ltd	Respraying of Road Vehicles
16/96	Kanes Haulage Ltd	Mobile Crusher
17/96	Hayward Coachworks,	Vehicle Respraying
19/93	CD Bramall Ltd	Respraying of Road Vehicles
20/98	Clifford Accident Repair Centre	Paint Spraying
WOB/2/94	Mr G Barlow,	Waste Oil Burner
WOB/3/94	Frank Follet Motors Ltd,	Waste Oil Burner
WOB/4/94	J D Thompson Motors Ltd,	Waste Oil Burner

Table A3.2 Petrol stations in St Albans District

Petrol Stations	
VOC/01/98	Sainsbury`s Supermarkets Ltd
VOC/03/98	Safeway Petrol Station
VOC/06/98	TotalFinaElf
VOC/08/98	Townsend Service Station
VOC/09/98	Greenlawns Garage, Bowers Leisure
VOC/10/98	Lawrence Auto Services
VOC/11/98	Star St Albans Marshalswick
VOC/12/98	Shell UK Ltd, Shell
VOC/13/98	Shell UK Ltd, Shell Petrol STation
VOC/14/98	TotalFinaElf
VOC/15/98	St Albans Service Station
VOC/16/98	Leaside Service Station
VOC/17/98	TotalFinaElf
VOC/18/98	St Albans Service Station
VOC/20/98	Shell UK Ltd, Shell Service Station (Smallford)
VOC/19/98	Shell UK Ltd, Shell Service Station
VOC/21/98	Mount Service Station
VOC/22/98	Classic Service Station
VOC/26/98	Radlet Road Service Station
VOC/27/00	Savacentre London Colney

netcen 90

Appendix 4

Descriptions of selected models and tools

CONTENTS

Simple screening models[3]

Design Manual for Roads and Bridges (DMRB) - This screening method was formulated by the former Department of Transport. The method gives a preliminary indication of air quality near roads. The DMRB method requires information on vehicle flow, HDV mix, vehicle speed and receptor-road distances. It contains a useful database of vehicular emission factors for future years.

The method adopts the annual mean concentration as the base statistic. Background pollutant levels are included explicitly in the calculations by adding an amount to the annual mean traffic contribution using the Air Quality Archive (paragraph 6.09) or default values The model also estimates, from the annual mean PM_{10} prediction, the number of days where the PM_{10} concentration exceeds the 50µg m^{-3} daily mean objective. The latest version of the DMRB nomogram (1.02, dated February 2003) has been used for this assessment. Details of the road layout cannot be specified.

[3] The information on simple screening models has been taken from LAQM.TG3 Review and Assessment: *Selection and use of dispersion models*.

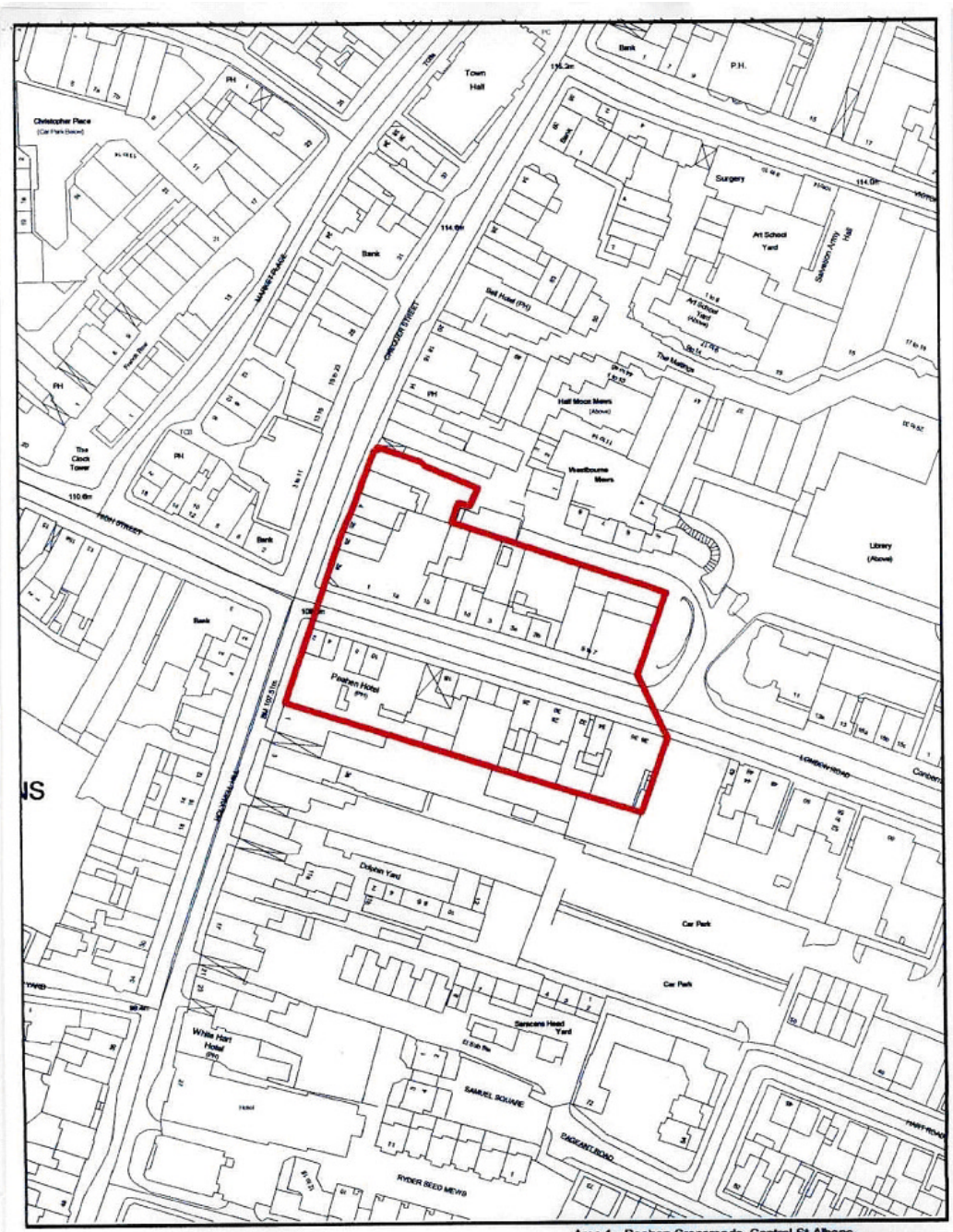
Appendix 5

Air Quality Management Areas

CONTENTS

Air Quality Management Area No. 1

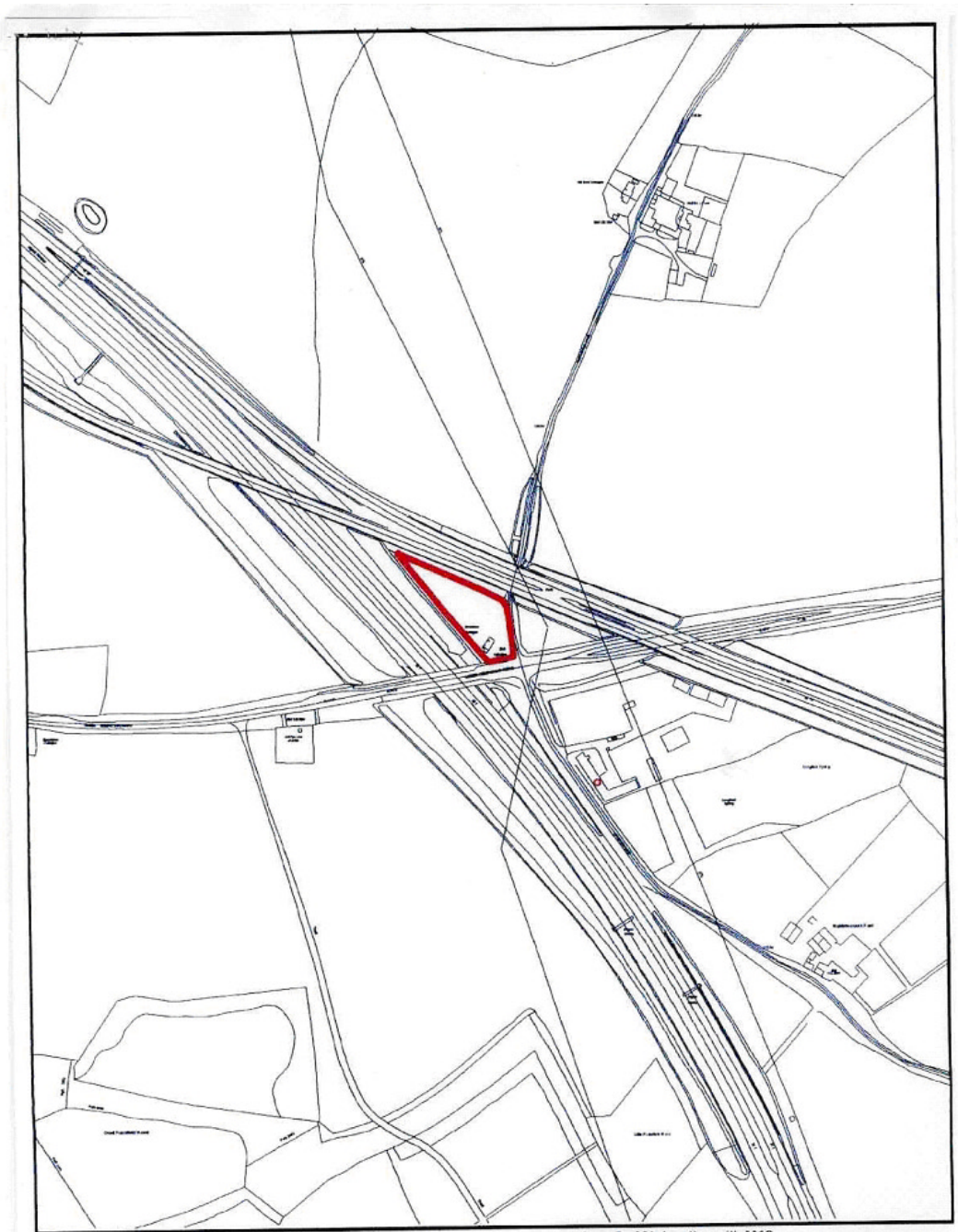
Description:	The area comprising of odd numbers 1-7 London Road and even numbers 2-38 London Road, St Albans.
Pollutants Declared:	Nitrogen dioxide (NO_2)



Air Quality Management Area No. 2

Description: The area comprising of Beechtree Cottages, Hemel Hempstead Road, St Albans (adjacent to junction of M1 (J7) and M10).

Pollutants Declared: Nitrogen dioxide (NO_2)



Air Quality Management Area No. 7

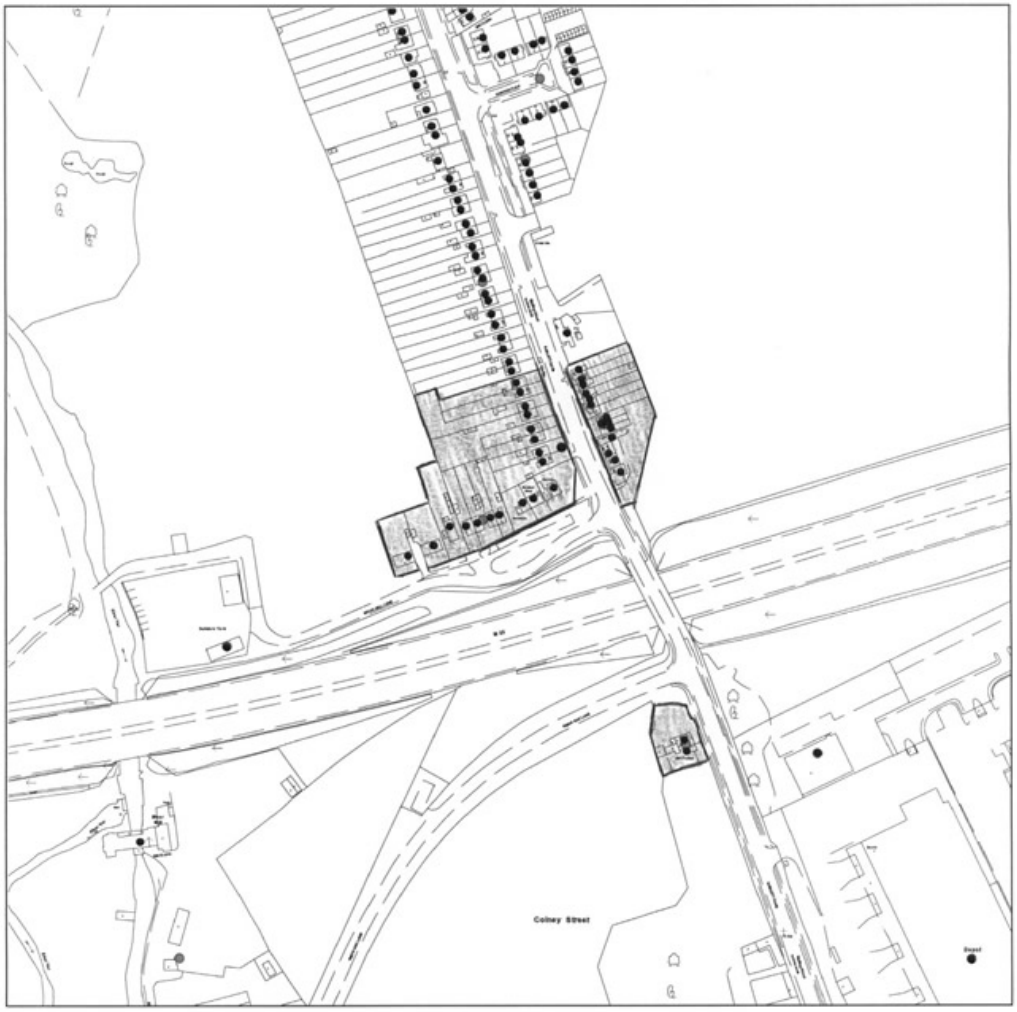
Description: An area encompassing a number of domestic properties in Frogmore and Colney Street in the vicinity of the M25.

Pollutants Declared: Nitrogen dioxide (NO_2)

Area 7

Domestic properties as highlighted

St Albans CITY AND DISTRICT



Scale : 1:3294

*Produced using ESRI (UK)'s MapExplorer 2.0 - **http://www.esriuk.com***

Organisation	Not Set
Department	Not Set
Comments	
Date	07 August 2002
SLA Number	Not Set